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# China Report

AGRICULTURE

No. 97

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21 August 1980

# CHINA REPORT

## AGRICULTURE

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### CONTENTS

PAGE

#### I. GENERAL INFORMATION

##### National

Difference Between Rich, Poor Production Teams Described (RENMIN RIBAO, 27 May 80) .....	1
Hailin County, Heilongjiang Province, by Han Leng Yingcheng County, Hubei Province, by Liu Chunbin, Tian Zhuang	
Expansion of Fishery Industry in Taihu Region Urged (Huang Wenxin, Liu Guangyu; GUANGMING RIBAO, 22 Apr 80)	4
Increased Pig Production Causes Problems (RENMIN RIBAO, 27 May 80) .....	7
Sichuan Urges Greater Fork Consumption Pig Glut in Shandong	
Food Grain Academy Screens Fungal Toxins (Li Linhe; GUANGMING RIBAO, 28 Jun 80) .....	10
Efforts To Obtain Food From Ocean Urged (Lai Derong; GUANGMING RIBAO, 4 Jul 80) .....	12
Aerial Sowing of Trees, Grass Promoted (RENMIN RIBAO, 25 Jun 80) .....	14
Soil Fertility, Cropping Patterns in Rice Fields (Xiao Shuxian; ZHONGGUO NONGYE KEXUE, May 80) .....	16

## Anhui

- Agricultural Aerial Service Team Serves Anhui  
(Hang Yan, Hu Youquan; GUANGMING RIBAO, 5 Jul 80) 39

## Guangdong

- Commune-Run Enterprises Urged To Respond to Markets  
(Ni Changjiang, et al.; NANFANG RIBAO, 26 May 80) 40

- Guangdong Forestry Accomplishments, Future Tasks  
Summarized  
(Zheng Qun; NANFANG RIBAO, 2 Jun 80) ..... 43

- Guangdong Sericultural Development Lags Behind  
(NANFANG RIBAO, 27 Apr 80) ..... 47

Old, New Areas, by Hai Jin, Shi Fangdong  
Lianjiang County, by Qi Yirui  
Foshan Region, by Wu Jiongwei

- Briefs  
Zhaoqing Prefecture Farm Export 51  
Nanhai County Spring Silkworms 51

## Henan

- Briefs  
Brigade Rapeseed Output 53

## Hunan

- Hybrid Rice Proves Its Superiority  
(RENMIN RIBAO, 28 Jun 80) ..... 54

## Jiangsu

- Jiangsu's Agriculture in the Seventies Reviewed  
(ZHONGGUO XINWEN, 28 Mar 80) ..... 56

## Sichuan

- Briefs  
Chongqing Small Reservoirs 58

## II. PUBLICATIONS

- Table of Contents of 'LINYE KEXUE' Vol 16 No 1, 1980  
(LINYE KEXUE, Vol 16, No 1, 1980) ..... 59

## I. GENERAL INFORMATION

### DIFFERENCE BETWEEN RICH, POOR PRODUCTION TEAMS DESCRIBED

Hailin County, Heilongjiang Province

Beijing RENMIN RIBAO in Chinese 27 May 80 p 2

[Article by Han Leng [7281 0397], deputy secretary, Hailin County CCP Committee, Heilongjiang Province: "Need To Help Poor Brigades Achieve Prosperity As Quickly As Possible"]

[Text] Our county has learned from experience that if rural villages are to become prosperous as soon as possible, attention has to be given to making rich brigades richer and to transforming poor brigades.

Because our province formerly gave a lot of emphasis to work with rich brigades and did little work to transform poor brigades, the richer the rich brigades became the richer they wanted to be, and the poorer the poorer brigades became, the more disheartened they became. As a result, a situation arose in which great development of agricultural production throughout the province became difficult. Per unit yields stayed at about 400 jin, total output was 170 to 180 million jin, contributions [to the state] did not exceed 30 million jin, and average per capita income was around 100 yuan.

The disparity between rich and poor brigades in our county is great. In terms of quantity of output, there are brigades with yields of 1,000 jin per mu and average individual contributions of half a ton; then there are also brigades where per mu yields are less than 100 jin where year after year the people eat grain that has been resold to them by the state. Looked at in terms of income level, there are brigades in which the value of a day's labor is more than 3 yuan and the average individual income per year is 300 yuan; then there are brigades in which the value of a day's labor is only .20 yuan and the average annual per capita income is less than 20 yuan. Looked at in terms of collective fixed assets, there are brigades that have property valued at from 100,000 yuan or so to several hundred thousand yuan; then there are "empty husk" brigades that are in debt year after year. Looked at in terms of the level of management, there are paddy field brigades in which production cost per jin of grain is .04 yuan, and dry field brigades in which production cost per jin of grain

is .02 yuan; then there are paddy field brigades in which the cost of producing a jin of grain is .10 yuan, and dry field brigades where the cost is .08 or .09 cents. Looked at in terms of kinds of things for development, some brigades have a full panoply of agriculture, forestry, livestock raising, sideline occupations, and fishing industry to be developed; then there are brigades with only a single product economy. Looked at in terms of production conditions, there are brigades in which problems concerning mountains, rivers, farmland, forests, and roads have been tackled in a comprehensive way to change the production conditions and which have strong bulwarks against disaster; then there are brigades which are on the whim of heaven to get enough to eat. Looked at in terms of implementation of policies, there are brigades that steadfastly adhere to each of the party's policies for rural villages, and then there are some whose policies are vacillating. Looked at in terms of leadership bodies, there are brigades in which leadership has remained stable for more than 10 years, where the cadres work in the present but think ahead to the future, and where the more they work, the more zealous they become. Then there are brigades in which the leaders are changed once each year and the cadres, like dutiful monks, simply strike the gong each day they are in residence. In short, our statistics show that prosperous brigades amount to 23 percent of the total number of brigades in the county, and poor brigades amount to 19 percent of the total brigades in the county.

These 19 percent poor brigades farm 30 percent of the total cultivated area, and their average per unit yields are only 180 jin of grain--lower than 55 percent of the average per unit yields in the entire county. Taking these figures by themselves, if it were possible to increase the per unit yields of poor brigades to the average level prevailing throughout the county, there would be an increase of 20 percent in the county's total grain production, and the stigma of eating grain brought from elsewhere could be removed. These figures tell us that the proportionate number of poor brigades is great, and this drags down agricultural production for the whole county. Yet, their potential is very great, and the extent of their possible increase is much much greater than the extent of possible increase for rich brigades. Consequently, while giving attention to the wealthy brigades, it is necessary also to help the poor brigades become prosperous as quickly as possible to increase the rural villages' level of prosperity throughout the county.

#### Yingcheng County, Hubei Province

Beijing RENMIN RIBAO in Chinese 27 May 80 p 2

[Article by Liu Chunbin [0491 4783 2430] and Tian Zhuang [3944 1641]:  
"Make Rich Brigades Richer and Help Poor Brigades Get Rich Quickly"]

[Text] The Yingcheng County CCP Committee in Hubei Province has improved the leadership of agricultural production, has helped the prosperous brigades summarize their experiences, has sought out disparities, and



continued to advance, while at the same time assisting poor brigades to open up new opportunities, develop production, and become prosperous quickly.

Last year, Yingcheng County triumphed over a serious drought to make great increases in agricultural yields. Fifteen percent of the production brigades throughout the county received higher levels of distribution with quite a few brigades getting more than 180 yuan. The county CCP Committee led these "out-in-front brigades" to summarize their experiences, to study "how rich brigades can become richer," and helped them further readjust their agricultural internally and, by adapting methods to the local situation, develop multiple bases for the production of fruit, forests, and Hubei mulberry trees to expand the communes' and brigades' businesses.

The entire province, about 19 percent of the brigades are poor brigades whose production base is poor, their collective accumulations scant, and distribution of income to commune members less than 80 yuan. One of the main reasons some brigades are poor is their single product economy and few production opportunities, so that natural resources or manpower resources cannot be fully utilized. The county CCP Committee has helped these poor brigades in accordance with their local conditions. Those located near mountains can go into the mountains to collect a bounty, and those located near the water can seek treasure in the water in a vigorous development of industrial sideline production and various businesses. Six production teams in the Mewan brigade of Langjun commune used to be squeezed into "0.8 mu to make revolution." They didn't have any industrial sideline production, and last year the average per capita income was less than 50 yuan. Last winter and this spring, each production team took advantage of its large manpower and numerous resources to build a fish hatchery on more than 70 mu of water. They also made plans to plant day lilies, fruit trees, melons and vegetables, taro, white lotuses, and water chestnuts in fields reclaimed from a lake and in barren hills, so as to grow more economic crops.

At the same time, for those poor brigades which lack the means of production where life was hard, the county disbursed more than 40,000 yuan as support funds and gave more than 60,000 yuan for agricultural investment to communes and brigades. Finance and trade departments also sent 270 cadres to help work at these brigades. Since the winter of last year, the departments concerned have made purchases of day lilies, sugarcane, long-haired rabbits, flathead geese [1627 7332 7709], and fish fry to help the poor brigades develop more businesses.

9432

CSO: 4007

# EXPANSION OF FISHERY INDUSTRY IN TAIHU REGION URGED

Beijing GUANGMING RIBAO in Chinese 22 Apr 80 p 2

[Article by Huang Wenxin [7806 2429 2450] and Liu Guangyu [0491 0342 3768] of the Agricultural Modernization Institute of the Jiangsu Provincial Academy of Agricultural Sciences: "How Does the Zhanghuang Brigade March Toward Agricultural Modernization?"]

[Text] The Zhanghuang Brigade of the Huangqiao Commune in Wuxian is mainly an agriculture and fishery brigade. It is a diversified and widely developed brigade. Since 1970--and especially since the year before last, when it became the base for fishery culture in ponds within the comprehensive scientific experimentation base for agricultural modernization in the Taihu region of Jiangsu Province--production developed rapidly, and this trend is welcomed.

Last year, total income from the entire brigade's production was 2.232 million yuan, an increase of 27.5 percent over the previous year and 3.9 times that of 1970. Total production of food grains was 2.063 million jin, a 3.8 percent increase over the year before last, and 1.6 times that of 1970. Total production of fresh fish was 500,000 jin, an increase of 31.6 percent over the year before last and 1.2 times that of 1970. These all surpassed the highest historical levels. Capital accumulation reached over 1.41 million yuan. There were 40 kinds of machinery--over 200 units with a total of more than 1300 horsepower. Per capita average of food grains reached 701 jin. Per capita income reached 232 yuan. In recent years, the commune members consumed over 50,000 jin of fresh fish each year, over 30 jin per person. The brigade also built over 240 rooms for commune members and began to solve the problem of housing for over 100 families. Elementary schools, cooperative medical care and small shops were also improved. Their major experience in realizing such achievements are as follows:

1. They began from water conservation and garden farming to improve the conditions of production and greatly raised the unit area yield. Beginning in 1973, the leading commune members of the Party branch of the brigade struggled for 6 winters and springs, built 2 watergates, dredged 4 waterways, dug over 2,000 meters of underground channels, repaired



1 highway, planted over 50,000 trees, leveled over 900 mu of farmland, and rebuilt 83 fishponds, totaling over 650 mu. The old farmlands that were uneven, of odd shapes and sizes and were not drained and irrigated by a complete system were reformed into level tracts of uniform size. Fields were made into squares and the land was made into high and stable yielding fields drained and irrigated by a complete system. Low yielding old fishponds were transformed into new stable and high yielding ponds. Food grain production increased from over 1,230 jin per mu in 1970 to last year's more than 2,100 jin per mu. Unit production of fresh fish increased from over 500 jin in 1970 to last year's 1,013 jin. The soil's productive rate has increased by onefold.

2. The proportions of agriculture, fishery, industry and sideline production were readjusted. Road of diversification and overall development was followed. "To become rich, there must be agriculture, fishery, processing, industry and sideline production." This is the summary of the experiences of over 20 years of the Zhangzhuang Brigade. In 1963, they set up a palm fiber plant but development has always been slow. Beginning in 1972, especially after the "gang of four" was crushed, the industries operated by the brigade developed rapidly. In 1977, the value of industrial production was worth 1.256 million yuan, a profit of 419,000 yuan. Last year's value of industrial production reached 1.678 million yuan, a profit of 522,000 yuan. Hog raising and domesticated fowl, clam and pearl culture and fruit trees all developed. Last year's industrial sideline production constituted 73.4 percent of the total value of production. Agriculture and fishery constituted 26.6 percent.

Diversification has accumulated massive capital for mechanization and found outlets for the large labor force freed by this mechanization. Since 1971, industries managed by the brigade accumulated a capital of over 686,000 yuan. Industrial sideline industries and the construction industry were able to arrange for over 300 laborers. It can be seen from this that changing a single economy to a diversified economy not only is the necessary road from poverty to wealth but is also the necessary road to hasten realization of agricultural modernization.

3. Engage in scientific experiment in a big way. Zhangzhuang Brigade, assisted by concerned scientific research units, established and made sound a scientific technological team and conducted many scientific experiments and stimulated production. Only two examples are given here: One is the use of dry straw (meaning the straw of rye and Sudan grass) to cultivate fish. They used three fishponds as experiment. Each 27.5 jin of dry grass can increase 1.6 jin of fishery production, an increase of 1 jin of grass carp and bream. Their excrement can also support half a jin of spotted silver carp and one ounce of African crucian carp. Using dry grass to cultivate fish can also stabilize the source of bait and save labor for collecting bait. The second is to use pellet bait to cultivate fish. Last year, they used straw of crops and barley meal, rapeseed cake

meal, fish meal, shell meal, and salt as raw material to make semi-floatable soft pellet bait. Two fishponds were used to experiment and a high per mu yield of 1,112 jin and 1,066 jin were achieved; each mu produced an increase of about 30 percent and the cost dropped by about 30 percent. In addition, they also conducted some other experiments which showed good results. For example, in the 200 mu bumper harvest fishpond experiment, unit yield reached 1,042 jin. In the high density fish culture experiment, per mu yield of the year before last was 30,300 jin, per mu yield last year was over 33,800 jin. The high density fish culture and hotbed fish fry preservation experiment not only explored ways for high yields in fishery but also pointed the way toward fish cultivation in a factory environment.

4. Follow the road of selective mechanization. In agriculture, they first solved the problem of the mechanization of drainage and irrigation, plowing under, threshing, and processing agricultural sideline products. Then they solved the problems of the mechanization of planting, tilling and harvesting. In fishery, they worked on the problems of mechanization of drainage and irrigation of fishponds, transportation and the collection and processing of fish bait. Then they solved the problem of mechanization of increasing oxygen in the fishponds and water purification. The number of machines is gradually being increased.

5. Insist on self-reliance. The development of the Zhangzhuang Brigade basically depended upon self-reliance. They solved their capital difficulty mainly by developing industry and sideline production. Since 1971, the accumulation of capital from industry and sideline production has reached 700,000 yuan.

The five major experiences of Zhangzhuang Brigade described above have a definite significance in regard to the realization of agricultural modernization in the Taihu region. This is because the weather in the Taihu region is mild, rainfall is plentiful, it is rich in resources and it has many advantageous conditions for developing diversification. The region also has the support of Changzhou, Wuxi and Suzhou, which are medium-size industrial cities. The conditions for developing commune and brigade industries are also better. In recent years, the rate of development of diversification and commune and brigade industries here is fast but the potential is still very great. In particular, rivers intertwine here, lakes abound, and fishponds and waternut ponds are scattered all over. Aquatic resources are very rich. The entire region has a total of 6.25 million mu of water surface, 20 percent of the entire fresh water surface of the whole province and 28 percent of the total land area of the entire region. But income from fishery constitutes only about 1.3 percent of the total income from agriculture. This shows the potential for developing fishery in the Taihu region is also great. Therefore, we believe that in the overall development of agriculture, animal husbandry, sideline production, fishery and industry, the development of fishery must be prominent so that Taihu can truly be what it is famous for as a place abundant in fish and rice.

## INCREASED PIG PRODUCTION CAUSES PROBLEMS

### Sichuan Urges Greater Pork Consumption

Beijing PENMIN RIBAO in Chinese 27 May 80 p 1

[Article from XINHUASHE, Chengdu 26 May: "Sichuan Urges Farmers To Eat More Pork"]

[Text] In Sichuan at the present time, there is a noticeable conflict between the larger state purchases and the smaller sales of pork. The Sichuan CCP Committee and the provincial people's government have decided to expand the marketing of pork in rural villages and to encourage the farmers to eat more pork in a program that gives equal emphasis to the marketing of pork in cities and the countryside.

Principal methods being used in this province are:

1. Broadening of the supply of pork in rural villages and cities alike throughout the province. A further drop of 5 fen per jin of the buy-back price for pork for commune members who sold pigs to the state and then use coupons given them at the time of sale in buying pork for their own use. This is a means of encouraging the farmers to buy more pork quickly.
2. Permit each production team to butcher three pigs tax free during the two busy harvest seasons; the provincial treasury will be responsible for paying the unpaid taxes so there will be no impairment of local tax revenues. Additionally, for every mature pig killed by a production brigade, the local food management company will pay a 3 yuan subsidy.
3. Beginning on 1 April, the transfer price of pork on the hoof will be lowered again in the province to encourage marketing in the local area. During May and June, there will be a temporary drop in the price of pork in cities and towns. The actual extent of price reductions for various grades, the timing, and the method used is to be determined by each city and area.

4. Encourage operating departments to expand marketing. Beginning on 1 April, every food and beverage industry in the cities and the countryside throughout the province will be given a preferential price drop of .10 yuan for every jin of pork sold in excess of the quantity of pork sold during the same period last year according to actual sales figures. Newly established food and beverage shops will be given a preferential price on the basis of 20 percent of their monthly supply, with a price decrease per jin of .10 yuan.

5. Increases in supply of pork to industrial and mining areas, to forestry industry regions, and to the Aba, Ganzi, and Liangshan minority people autonomous zhous, to be subsidized by food company units doing business in these areas.

6. More pig skinning. A goal to increase the originally planned 5.5 million skins provincewide by 2.5-3 million skins.

#### Pig Glut in Shandong

Beijing RENMIN RIBAO in Chinese 27 May 80 p 1

[Article: "Farmers Urgently Hope for a Solution to the Difficult Problem of Selling Pigs. Letter Published by XINHUASHE Reflects Demands of the Masses in Mengyin County in Shandong Province"]

[Text] On 26 May, XINHUASHE published a letter from correspondent Su Deming [5685 1795 2494] and reporter Chen Bijiang [7115 1801 1412] on the subject of "Farmers Urgently Hope for a Solution to the Difficulty of Selling Pigs," which reflect attitudes in numerous places in Mengyin County in Shandong Province about the restrictions on the sale of pigs by commune members. Already to some places sows have been disposed of by commune members who are longer desire to raise hogs.

The letter said that in Mengyin County pig raising had developed quite rapidly. As of the end of March, the number of slaughter hogs on hand totalled 187,200, 64,000 of which weighed more than 150 jin. However, during a single quarter, this county had sold only 16,256 hogs to the state. The method for state purchases of slaughter hogs is as follows: Each month the County Food Company issues sales certificates to communes, brigades, and production teams on the basis of state purchase quotas. Only with these certificates may commune members make sales. Usually a large village will be issued four or five such certificates each month, and a small village will receive only two or three. When faced with no other choice, many farmers will slaughter their own pig and take it to market to be sold at a lower price. According to statistics, at the more than 30 markets held between 1 March and 17 April throughout the county, commune members, acting as private individuals, sold a total of more than 2,500 hogs which they had slaughtered and taken to the market.

As to the difficulties farmers face in selling their pork, the incoming letters also reflect that although the employees of the Mengyin County food system are burning with impatience, they are powerless to act since the county food company's sole 500-ton cold storage unit was filled with 580 tons of frozen pork as of the end of March. They have reported their plight to the prefecture, but the prefecture cannot solve the problem either. They asked the province for assistance, but the provincial department of commerce only issued instructions permitting 4,000 head of live pigs or frozen pork to be transported out of the county, but this is simply inadequate to solve the problem of the 46,000 pigs on hand in pens, most of which weigh over 200 jin. In order to expand the quantity of pork marketed, beginning on 15 April Shandong Province lowered pork sale prices by 20 percent throughout the province. Within 15 days, 730,000 jin of Mengyin County's pork, with the bone in, was sold at the slashed prices; however, a look at the market situation during the past several days shows that even though the price of pork with bones in has fallen from the previous .96 to .77 yuan, only about 10,000 jin can be sold daily throughout the county, and the problem remains unsolved. Because a serious imbalance exists between state purchases and state sales the number of fattened hogs on hand throughout the county continues to increase. Right now, most farm household have one or two head on hand, with some having as many as four or five. The grain intended to feed a family is consumed entirely by the pigs. Consequently, the cadres and the masses here desperately hope that the authorities concerned will take urgent steps to achieve a practical solution to the farmers' difficulty in selling hogs.

9432

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FOOD GRAIN ACADEMY SCREENS FUNGAL TOXINS

Beijing GUANGMING RIBAO In Chinese 28 Jun 80 p 2

[Article by Li Linhe (2621 2651 3109)] "Teachers at Zhengzhou Food Grain Academy Successfully Screen Fungal Toxins"

[Text] The Zhengzhou Food Grain Academy's teachers Yin Weishen [3009 5588 3947], Wei Yunlu [7614 0061 6424] and Zhuang Gui [8369 2710] have discovered *aspergillus versicolor* for the first time in our nation's yellow rice grains and have screened out the *aspergillus nidulans* that produce high toxicity. Their efforts have filled a blank in our nation's blank in the study of mycotoxicosis in our nation.

In some places in our nation, rice grains frequently turn yellow because they were harvested during rainy and overcast days or they were placed in storage without being sufficiently dried. The Japanese call this kind of rice the rice that has yellowed and believe the yellowing is caused by contamination due to three kinds of toxin-producing *aspergilli*. The rice contains cancer-producing *aspergillus* toxin. Therefore, some people have also mistakenly believed our nation's yellow rice was the yellow rice reported in Japan. To assure people's health and solve the problem of toxicity of our nation's yellow rice, three teachers of the Zhengzhou Food Grain Academy, Yin Weishen et al, began in 1977 to examine fungal toxins and survey toxic bacteria and bacterial phase found in samples of yellow rice gathered from different provinces. Results of studies over the past several years show that our nation's yellow rice is different from the yellow rice reported in Japan in the distribution of bacterial phase and in the types of fungal toxins. The major contaminating fungi of our nation's yellow rice are the *aspergillus flavus*, and *aspergillus nidulans* as well as the *aspergillus fumigatus*. They contain *aspergillus versicolor*. They studied the toxicity of yellow rice, produced the color pure crystals of the *aspergillus versicolor* and established the method of testing *aspergillus versicolor* in rice.

From May 28 to June 1, the Ministry of Food Grains organized concerned public health departments, food grain departments, institutes of higher learning, scientific and research units throughout the nation and reviewed the

achievements of the research conducted by the three comrades of Yin Weishen et al. The review panel decided their production of color pure crystals of the aspergillus versicolor of advanced international standards and establishment of the method of detection were applicable. This achievement has a great significance in further developing our nation's work in sanitary inspection of foodstuffs.

9296

CSO: 4007

## EFFORTS TO OBTAIN FOOD FROM OCEAN URGED

Beijing GUANGMING RIBAO in Chinese 4 Jul 80 p 4

[Article by Lai Derong (6351 1795 2837): "Change the Sea Into an 'Animal Farm'"]

[Text] The sea is like a land, natural living resources are limited. Therefore, development of endeavors to increase production of the sea and cultivation of oceanic resources is an important path towards searching for more food from the ocean in the future.

According to estimates, the entire world has about one billion acres of coastal swamp land. If 10 percent of it is used to cultivate aquatic products of the ocean, even when such efforts are carried out over a large area without strict controls, an annual production of 100 million tons of ocean aquatic products can be produced.

Development of ocean aquatic cultivation to obtain animal protein from the ocean is more economical than raising cows and sheep on land. If one acre of grassland is converted to a fish pond, the amount of food provided by the fish is equivalent to ten times the amount produced by the same area used to raise cows. In the state of Arkansas in the United States, each acre's yield of catfish frequently surpasses one ton. Raft type cultivation of mussels can yield up to 200,000 jin per hectare while annual yield of beef from cows raised on one hectare of grassland is only 340 jin. Our nation's Yellow Sea, Bohai, East Sea and South Sea all have spawning grounds of various kinds of fish. They possess good natural conditions of artificial cultivation of fish. According to preliminary estimates, the area of the East Sea from south of 34 degrees N latitude to the Nanao Island covers an area of 83,000 square kilometers and within a depth of 20 meters, most of it is suitable for shallow sea water cultivation of fish. If 20 percent of the area is used to cultivate shallow water fish, the annual yield of oceanic aquatic products can reach 60 million tons, about the total of all the yield of the world's ocean fishing at present!

To adapt to the need to obtain protein from the ocean, each nation is presently becoming more active in the study of the techniques of increasing

production and cultivation of ocean fish. The study of chemical signals of hormonal sexual attractants has attracted the most attention. Migratory fish can return to the original river to spawn many years after migrating across the ocean because the water of the original river contains a kind of chemical material that attracts the fish to migrate back to the spawning ground. This material has been called the chemical "fingerprint." If the secrets of the "chemical fingerprint" is uncovered, a great breakthrough in the cultivation of migratory fish will occur. At that time, directional chemical agents can be used to attract sexually mature fish to be herded into cultivating grounds. The semen and eggs of the fish can be pressed out and artificially inseminated. Then the parents can be caught and sold on the market. Artificially spawned fish fry can be conditioned to respond to the chemical "fingerprint" or "marked signal" artificially, then they can be released into the ocean for several years of growth. After several stages of migration, they can be lured by the chemical "fingerprint" or "marked signal" back to the man-made propagation ground. It can be foreseen that as the questions in the study of chemical signals in hormonal sexual attractants are thoroughly answered, this ideal will become reality.

Surveys indicate reproduction of fish in regions of upward currents is especially high. Although these regions constitute only one one-thousandth of the area of the oceans, they can provide over 100 million tons of aquatic products. If "cultivation of the sea" by man can be carried out to bring the fertile waters of the deep seas to the surface and create large areas of upward currents, the propagation of floating plants can be stimulated. The "deserts" of the seas can be turned into "oases," producing an abundance of fishery resources. Progress has been made in the study of this endeavor.

Living resources of the ocean are the common wealth of mankind. People have the right to explore them, utilize them and at the same time have the duty to protect them and develop them. Only in this way can ocean resources ceaselessly provide rich animal protein for mankind and satisfy the ever increasing needs of man.

9296

CSO: 4007

## AERIAL SOWING OF TREES, GRASS PROMOTED

Beijing RENMIN RIBAO in Chinese 25 Jun 80 p 2

[Article: "Expand Aerial Sowing Experience to Accelerate the Greening Program"]

[Text] The northern aerial sowing and afforestation experience exchange conference recently held by the Ministry of Forestry, the Civil Aviation General Administration and the Chinese Academy of Forestry Sciences pointed out that afforestation and grass seeding by aerial sowing is an effective way of speeding up the greening of mountains and wastelands in the north. The conference requested that the scope of aerial seeding be expanded in regions where successful experience has been obtained.

The conference was held in Chengde City, Hebei Province. The participants visited aerial seeding and afforestation sites in Chengde and Longhua counties and exchanged experience.

In the last few years, experiments on aerial sowing for afforestation and grass seeding have been carried out in stone mountain, loess plateau and windy and sandy regions of Hebei and Shaanxi provinces. There has been successful experience, but there have also been lessons from failure.

The conference participants pointed out that in some regions in the north, rain is scarce and the soil poor, plant cover is sparse, and human inhabitants are few and communications difficult, so that it is rather difficult to carry out large-scale artificial afforestation; but if the laws governing the success of experiments on aerial seeding for afforestation and grass seeding in the north are grasped and extended, they will be of great significance in extending afforestation and greening program in this region.

Aerial sowing for afforestation and grass seeding require that seeds be prepared and suitable areas chosen, and that good weather and precipitation predictions be made in close cooperation with the meteorological departments. If this work is done well, it will be possible to achieve good results.



The conference participants discussed some problems involved in aerial sowing, the principal ones of which are: aerial sowing tasks have not been included in the state plan, the investments have not been guaranteed, and most provinces and prefectures do not have aerial seeding management organs; the variety of tree seeds for aerial sowing is limited and the sources of some tree and grass seeds are inadequate; and protective and management work cannot keep pace.

Everyone believed that in order to make a success of aerial sowing it is necessary to do the following types of work well: 1) draw up plans for aerial sowing for afforestation and grass seeding; 2) set up seed bases; 3) strengthen scientific research; 4) include aerial seeding in the state plan and arrange for the investments; 5) set up aerial seeding leadership organs and increase the number of aerial seeding specialists.

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CSO: 4007

## SOIL FERTILITY, CROPPING PATTERNS IN RICE FIELDS

Beijing ZHONGGUO NONGYE KEXUE [SCIENTIA AGRICULTURA SINICA] in Chinese  
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[Article by Xiao Shuxian [5135 1859 6343] of the Agricultural Science Institute of the Liuzhou Region of Guangxi: "The Effect of Increasing Production by Different Methods of Multiple Cropping and Rotation Cropping of Double Cropping Rice in Winter and Their Effects Upon Soil Fertility"]

[Text] Under the present productive conditions of soil fertility, fertilizers and labor force, should the triple cropping system or the double cropping system be popularized throughout regions of double rice crops? What kinds of multiple planting system and rotation cropping methods could fully utilize the land and actively nourish the land, produce stable and high yields, increase production and harvest, stimulate favorable conditions and avoid unfavorable conditions? These are problems in the southern regions of double rice crops that need to be urgently solved. Therefore, we conducted 3 years of continuous experiments and studies from 1977 to 1979. The experiments were based on the summary of the mass experience in large-area multiple planting and rotation cropping. Small-area experiments were conducted at fixed localities inside the institute. Wheat, rape, winter beans (for food and fertilizer) and vetch were used as winter crops of double cropping rice. Drying the soil after plowing and winter fallow land served as contrasts. Wheat was treated in two ways, one applied with an ordinary amount of fertilizers and the other applied with multiple amounts of fertilizers. The small area was 0.1 mu in size. The random area was arranged in groups. The experiment was repeated three times. The type and amount of fertilizers applied throughout the entire year for each treatment were the same. These were determined by the need of the crops for fertilizers during the year. To satisfy the above requirements, the level of fertilization in this experiment was relatively low. A total of 2,000 jin of hog manure, 2,000 jin of cow manure, grass ash of 1,000 jin, urea of 25 jin, phosphorus fertilizers of 50 jin, and potassium fertilizers of 20 jin were applied annually to each mu. In the treatment of wheat-double cropping rice applied with multiple amounts of fertilizers, the amount of fertilizers applied was doubled. The results of the experiment are described as follows:

## The Effect of Different Multiple Cropping Methods and Rotation Cropping Methods for Double Cropping Rice in Winter Upon the Yield and Their Economic Benefits

### 1. The Effect of Different Winter Planted Crops Upon the Yield of Paddy Rice

The effect of different winter planted crops upon the late crop of early rice was large but the effect upon late rice was small. Table 1 shows winter planted vetch as green manure visibly increases yield of early rice, showing an increase of 21.1 percent in yield over the contrast and an increase of 50.5 percent in yield over wheat fertilized ordinarily. But winter planted vetch as green manure does not increase the yield of late rice. The results of the three years showed that the yield slightly reduced in 2 of the 3 years and increased only in one year. The increases and reduction in yield were not obvious. Winter planted winter beans can produce a crop of winter bean seeds and the stalks can be returned to the fields. The yield of early rice that followed showed an increase of 14.42 percent over the contrast and an increase of 42.3 percent over wheat fertilized ordinarily, but it had no effect upon increasing the yield of late rice. Winter planted rape without increasing the application of fertilizers produced basically the same yield as the yield of early rice as contrast, and produced an increase of 25.4 percent yield over wheat fertilized ordinarily. Also, a crop of oil can be harvested in addition. Winter planted wheat under ordinary fertilization not only caused early rice to produce a 15.6 percent less yield than the contrast but even late rice yielded 3.7 percent less than the contrast. And when each crop was fertilized by multiple amounts of fertilizers, the early rice planted in wheat fields did not yield less than the contrast but yielded less than the early rice planted in vetch fields and winter bean fields by 48.4 percent and 42.3 percent respectively. Late rice, after being fertilized with multiple amounts of fertilizers, produced increased yields over other treatment.

### 2. The Effect of Different Multiple Planting Methods and Rotation Cropping Methods of Double Cropping Rice Upon the Total Annual Yield and Total Harvest

In the total yield of food grains for the entire year, the highest yield was produced by multiple planting and rotation cropping methods of rice-rice-green manure and rice-rice-winter beans. They produced an increase of 11.63 percent and 11.59 percent more in yield than the rotation cropping method of fallow land-double cropping of rice, and they produced an increase of 8.83 percent and 11.30 percent more in yield than the rotation method of wheat (ordinarily fertilized)-double cropping rice. The total yield of food grains of the rotation cropping system of wheat-double cropping rice when no additional fertilizers were applied was basically the same as the contrast. The total yield of food grains of the rotation method of wheat fertilized by multiple amounts wheat of fertilizers-double cropping rice showed an increase of 25.9 percent over the contrast. It

also showed an increase of 12.8 percent over the total yield of the rotation cropping method of rotation cropping of rape-double cropping rice was basically the same as the contrast. But an additional crop of oil can be harvested. This has a definite significance in solving the problem of edible oil for the farmers in rice producing regions. In the production of each jin of nitrogen and the amount of food grains produced each day of work and net profits, the rotation cropping methods of vetch-double cropping rice or winter beans-double cropping rice produced the highest yields, and the cost to produce each jin of food grains was the lowest. Planting wheat in winter requires additional manpower, seeds, and farm chemicals, therefore, the amount of food grains produced each working day and cash (earned) were both lower than the contrast by 52.72 percent and 82.6 percent respectively. The cost of each jin of food grains rose from 0.055 yuan to 0.067 yuan. As a result of multiple applications of fertilizers, the total yield showed an increase of 25.9 percent over the contrast but the amount of food grains produced each working day and by each jin of nitrogen was lower than the contrast by 58.9 percent and 33.30 percent respectively. Case revenue from each work day dropped from 1.9 yuan to 0.75 yuan. The cost of each jin of food grains rose from 0.055 yuan to 0.08 yuan (See Table 2 for details).

The above results were consistent with the actual practices of cultivation over large areas by the masses. According to the survey of the Shigang Brigade of the Tongling Commune in Wuxuan County, 807.4 mu of wheat was planted in rice fields in 1973 (about two times the area of past years). Because of insufficient fertilizers and manpower, the planting season was missed. The per mu yield of early rice dropped from the original 529.6 jin to 488.4 jin. The amount of food grains produced in the entire year dropped by 165,560 jin. The local masses said: "Planting wheat in rice fields is borrowing food grains to consume food grains." "Harvesting wheat means losing grain." Therefore wheat is not usually planted in double cropping rice regions where food grains are relatively abundant. Wheat is only planted in rice regions where spring food grains are scarce.

Table 1. Effect of Different Winter Crops Upon the Yield of Paddy Rice  
(Three-year average, 1977-1979)

(1) 冬 种 作 物	(8) 早 稻			(12) 晚 稻			(16) 备 注
	(9) 平均亩产 (斤)	(10) 比 对 照 增 (斤/亩)	(11) 比 对 照 增 (%)	(13) 平均亩产 (斤)	(14) 比 对 照 增 (斤/亩)	(15) 比 对 照 增 (%)	
(2) 休 闲 (对照)	571.6	—	—	489.7	—	—	差异显著值 (17)
(3) 苕 子	691.9	120.3**	21.05	492.6	2.8	0.57	早稻: (18) *P 0.05 = 19.25斤
(4) 冬 豆	654.0	82.4**	14.42	493.5	3.8	0.76	**P 0.01 = 32.6斤
(5) 油 菜	578.5	4.9	0.85	485.2	-4.5	-0.92	晚稻: (19) *P 0.05 = 28.6斤
(6) 小 麦 (一般肥)	459.6	-112.0**	-19.59	473.2	-16.5	-3.7	**P 0.01 = 48.56斤
(7) 小 麦 (多肥)	574.8	3.0	0.52	530.4	40.7*	8.31	

Key:

1. Winter planted crops
2. Fallow land (contrast)
3. Vetch
4. Winter beans
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized by multiple amounts)
8. Early rice
9. Average per mu yield (jin)
10. Increase over contrast (jin/mu)
11. Increase over contrast (%)
12. Late rice
13. Average per mu yield (jin)
14. Increase over contrast (jin/mu)
15. Increase over contrast (%)
16. Remark
17. Value of significant difference
18. Early rice  
\*P 0.05 = 19.25 jin  
\*\*P 0.01 = 32.6 jin
19. Late rice  
\*P 0.05 = 28.6 jin  
\*\*P 0.01 = 48.56 jin



Table 2. Total Yield and Economic Benefits of Double Cropping Rice Planted in Different Multiple and Rotation Cropping Methods (Three-year average, 1977-1979)

(1) 轮作类型	(8) 全年各作物产量(斤/亩)			(15) 比对照增产(%)	(16) 每斤氮增产(斤)	(17) 每亩总收入(元)	(18) 每亩生产成本(元)	(19) 每亩净收入(元)	(20) 每亩用工数(个)	(21) 每个劳动日收入	
	水稻(9)	冬作物(10)	合计(11)							粮食(斤)(22)	现金(元)(23)
(2) 休闲—双季稻	1061.3		1061.3	0	37.9	106.1	88.4	0.055	25	42.4	1.90
(3) 苕子—双季稻	1184.4	3311(12)	1184.4	11.59	42.3	118.4	60.9	0.051	27	44.9	2.14
(4) 冬豆—双季稻	1147.5	85.5(13) 928.5(14)	1215.0	11.63	44.1	124.9	63.4	0.051	30	41.1	2.05
(5) 油菜—双季稻	1061.7	80.8(14)	1061.7	0.03	37.9	119.0	66.2	0.055	32	42.5	1.70
(6) 小麦—双季稻(一般肥)	932.8	155.5	1088.3	2.54	38.7	111.9	73.2	0.067	37	29.4	1.04
(7) 小麦—双季稻(多肥)	1105.0	231.6	1336.6	25.94	23.85	135.3	106.9	0.080	42	31.8	0.75

Remark: The yield of various crops listed in this table are converted according to locally listed prices. Yield of rapeseeds is not included in total production. Production costs include fertilizers, seeds, farm chemicals and manpower costs.

Key:

1. Type of rotation cropping
2. Fallow land-double cropping rice
3. Vetch-double cropping rice
4. Winter beans-double cropping rice
5. Rape-double cropping rice
6. Wheat-double cropping rice
7. Wheat-double cropping rice (fertilized by multiple amounts)
8. Annual yield of each crop (jin/mu)
9. Paddy rice
10. Winter crop
11. Total
12. 3311 (fresh stem and leaf)
13. 85.5 (seeds)
14. 928.5 (stem and leaf)
15. Increase over contrast (%)
16. Yield of food grains of each jin of nitrogen (jin)
17. Total revenue per mu (yuan)
18. Production cost per mu (yuan)
19. Cost of each jin of food grains (yuan)
20. Workers needed per mu (persons)
21. Revenue per working day
22. Foodgrains (jin)
23. Cash (yuan)

### 3. Effects of Different Winter Crops Upon the Growth and Development of Paddy Rice and Its Economic Characteristics

Crop openings of different winter crops affect both the growth and development of early rice and the increase or decrease of tillers. Figure 1 and Figure 2 show that tillering and plant height of early rice following vetch and winter beans were both better than other treatments while early rice following wheat was not as well grown as in other treatments. Field observation shows that early rice in green manure fields returns to green one week earlier than that planted in wheat fields. This can stimulate early growth and early development of early rice and early rice will tiller fast and will have plenty of tillers. Planting rice in rape fields yields the second best result. Rice planted in wheat fields fertilized ordinarily produces the worst yield. In panicle formation and fruiting, green manure produces more effective panicles, but the percentage of formation of panicles is low and the percentage of semi-filled grains is high. Rape stimulates fruiting of early rice. The percentage of formation of panicles of early rice planted in wheat fields is high, but because the latter growth period for tillers is short, accumulation of nutrients is affected and the panicles are short, the number of grains are few and the yield is low.

Different winter crops do not affect the growth and development of late rice much. The growth trend of late rice following winter planted green manure is similar to that of the contrast. The yield of late rice following wheat fertilized normally is slightly poorer than other treatments. Late rice planted in fields following wheat fertilized in multiple amounts performed better than other treatments. Rape fields exert a favorable effect upon fruiting of late rice (See Table 3 for details).

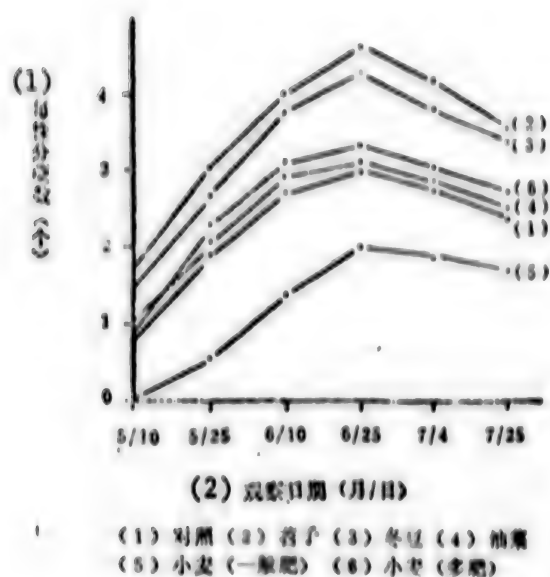


Figure 1. Effect of Different Winter Crops Upon the Increase and Decrease of Tillers of Early Rice

Key:

1. Number of tillers per plant (tiller)
2. Dates of observation (month/day)
- (1) Contrast
- (2) Vetch
- (3) Winter beans
- (4) Rape
- (5) Wheat (ordinarily fertilizers)
- (6) Wheat (fertilized by multiple amounts)

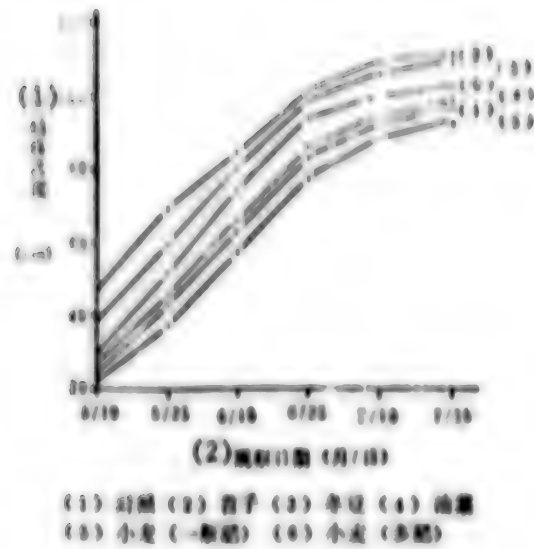


Figure 2. Effect of Different Winter Crops Upon Development of the Early Rice Plants

Key:

1. Plant height (cm)
2. Observation dates (month/day)
- (1) Contrast
- (2) Vetch
- (3) Winter bean
- (4) Rape
- (5) Wheat (ordinarily fertilized)
- (6) Wheat (fertilized in multiple amounts)

Table 3. Effects of Different Winter Crops Upon the Economic Characteristics of Paddy Rice

(1) 冬作物	(8) 早 稻						(15) 晚 稻					
	(9) 有效穗 (萬/畝)	(10) 穗長 (cm)	(11) 每穗粒數 (粒/穗)	(12) 半充實粒 (%)	(13) 千粒重 (克)	(14) 晚稻 (克)	(9) 有效穗 (萬/畝)	(10) 穗長 (cm)	(11) 每穗粒數 (粒/穗)	(12) 半充實粒 (%)	(13) 千粒重 (克)	(14) 晚稻 (克)
(2) 休 閑	18.7	79.1	18.9	68.1	11.6	25.95	18.9	83.1	19.8	61.7	18.2	24.43
(3) 落 子	20.9	78.4	20.9	69.5	10.2	26.68	19.8	83.9	20.1	69.2	18.9	24.61
(4) 綠 豆	20.1	79.2	20.5	69.6	12.5	26.19	19.7	83.2	20.0	69.9	18.5	24.59
(5) 黃 豆	18.9	79.9	18.5	65.9	10.4	26.72	19.8	82.7	20.0	69.5	18.7	24.83
(6) 小麥(一般肥)	17.3	80.7	17.3	51.4	15.4	24.88	19.4	83.3	19.4	18.9	18.2	24.32
(7) 小麥(多肥)	18.3	89.5	18.4	66.5	13.0	25.99	21.2	86.3	21.2	61.7	19.2	24.73

Key:

1. Winter crops
2. Fallow land
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized in multiple amounts)
8. Early rice
9. Effective panicles per mu
10. Percentage of formation of panicles (%)
11. Length of panicle (cm)
12. Number of full grains (grains/panicle)
13. Percentage of semi-filled grains (%)
14. Thousand grain weight (gram)
15. Late rice



## The Effect of Different Winter Crops in Double Cropping Rice Fields Upon Soil Fertility

Different forecrops provide the soil with different cumulative substances (remnants of roots of crops and branches and leaves) and take away different substances from the soil (via farm products). Thus the effect of different forecrops upon the soil is different.

It can be seen from Table 4 that vetch and winter beans leave the largest amount of organic substance in the soil (including the stem and leaves above ground and underground root system). The quality is good (nitrogen content is high, C/N ratio is low). Although the roots and stubble and remnants left in the soil by wheat is plentiful, the nitrogen content is low and the C/N ratio is high. Rape does not leave a lot of remnants in the soil, but the nitrogen content is high, the C/N ratio is low. Therefore the accumulation of organic matter and the increase and decrease of the soil's nutrients in the soil of the different forecrops are different.

Table 5 shows that after plowing under vetch and winter beans as green manure, the entire nitrogen content of the soil increased 25.8 percent and 18.5 percent over the contrast respectively. Organic matter increased 10.41 percent and 9.88 percent. The usable nitrogenous nutrients in the soil increased from 1.5 to 2 times that in the contrast fields and in winter wheat fields. Intensity of nitrogenous supply was higher than all other treatments. Saline base conversion in every 100 grams of soil was higher than the contrast by 1.12 milligrams and 1.2 milligrams of equivalent weight. The ability of the soil to preserve fertilizers was raised. After cultivating winter wheat, the soil's fertility visibly dropped. The organic matter in the soil was less than the contrast by 7.1 percent. The entire nitrogen content was less by 22.4%. The saline base conversion for every 100 grams dropped by 1.16 milligrams equivalent weight. The intensity of nitrogenous supply in the soil visibly dropped. In the wheat-rice-rice cropping method, with application of multiple amounts of fertilizers, the detrimental effect of wheat upon the nutrients for plants of the following crop can be eliminated, and the balance of the nutrients of the soil can be preserved. Winter planting of rape can raise the organic matter of the soil slightly because of the remnants of fallen flowers, fallen leaves and roots and stubble in the soil. The entire nitrogen content drops slightly but the intensity of the supply of nitrogen and phosphorus slightly increases. Increase in the content of phosphorus may be due to the fact that the root system of rape is deep and can absorb and utilize the phosphorus at the bottom layers which ordinary crops cannot. Phosphorus is returned to the soil via the roots' secretion or remnant roots in the soil. The content of immediately effective potassium and phosphorus in the soil in fields after winter planting of vetch, winter beans and rape is higher than that of the contrast. This indicates that some crops can activate the soil's phosphorous and potassium nutrients.

After multiple planting of early rice in tilled fields of different winter crops, the variation in the activity of the soil's ammoniacal nitrogen is

great. Figure 3 shows that after vetch is plowed under as green manure, the content of ammoniacal nitrogen during the early period of growth of early rice is high. It reaches a peak 20 days after plowing under as green manure to 45 ppm and remains at this level for 10 days and then rapidly drops to 60 days after plowing under when the content of ammoniacal nitrogen in the soil approaches that of the contrast and is lower than that in wheat regions fertilized by multiple amounts of fertilizers. The rate of release of ammoniacal nitrogen during the early period of the winter bean fields is slightly slower than fields planted with vetch. The release of ammoniacal nitrogen in the soil of wheat fields ordinarily fertilized is slow and scarce. The content of ammoniacal nitrogen from the time of returning green to the time of tillering is especially low. It gradually increases only during the middle period of growth. Because the nutritive conditions during the early growth period is poor, paddy rice returns green slowly, the tillers are few and the yield of early rice is seriously affected. The amount of ammoniacal nitrogen during the early period of growth in wheat fields fertilized by multiple amounts of fertilizers is slightly less than that in the contrast region and gradually increases only during the tillering period and then remains outstandingly abundant.

After early and late rice are planted as multiple crops in different winter crop fields, the soil's content of organic matter and nitrogen increases and decreases greatly. Figures 4 and 5 show the content of organic matter and nitrogen in the soil drops visibly when early rice is planted as a multiple crop in vetch fields. The content is slightly less than that of the contrast fields but the soil's C/N ratio increases slightly. The content also visibly drops in winter bean fields but the decrease is smaller than that of vetch fields. The change in the C/N ratio is not too large. After early rice is planted as a multiple crop in rape fields and fallow land, the soil's content of organic matter and nitrogen also drops but the decrease is far less than that of vetch fields and winter bean fields. After early rice is planted as a multiple crop in wheat fields, the content of the soil's organic matter and nitrogen slightly increases and the soil's C/N ratio drops. This may be because the C/N ratio of the field after planting wheat is high (reaching 41.9 to 51.6). Fertilizers decompose slowly, early rice grows poorly, and the amount of nutrients being absorbed and utilized is small. The C/N ratio of vetch in vetch fields is low (3.59). Not only is vetch itself easily decomposed, but also under the influence of a "sudden burst effect," decomposition of the original organic matter in the soil is stimulated, and the immediately effective nutrients of the soil are increased. Therefore the amount of nutrients being absorbed and utilized by paddy rice is higher while the amount of organic matter and nutrients accumulated in the soil visibly drops. When winter beans are plowed under as green manure, the stems are relatively old, the C/N ratio is higher than vetch, therefore its decomposition is slower than vetch. Thus, after early rice is planted as a multiple crop, the content of the soil's organic matter and nitrogen does not drop as visibly as in the vetch fields. But after

multiple planting of late rice in different winter crops, the content of organic matter and nitrogen in the soil increases, and the increase in vetch fields and winter bean fields is the greatest. This is because the yield of early rice in vetch fields and winter bean fields is high and more remnant roots and stubble are left in the soil. These are favorable to the accumulation of organic matter and nitrogen. The average results of 3 years show the change throughout the entire year. They indicate that the content of the soil's organic matter and nitrogen in fields planted with vetch or winter beans--double cropping rice and wheat fertilized by multiple amounts of fertilizers--double cropping rice rotations is slightly more than that in the contrast fields. The content of the fields of ordinarily fertilized wheat--double cropping rice is visibly less than that of the contrast fields. The change in the content in the fields of rape--double cropping rice is not large. This indicates winter planting of green manure (or semi-green manure) or increasing fertilization are both beneficial to the accumulation of organic matter in the soil.

Table 4. Amount and Quality of Plant Remnants Left in the Soil By Different Forecrops

(1) 冬前作物	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(1) 冬前作物	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(2) 冬前作物	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(3) 冬前作物	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(4) 冬前作物	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(5) 小麦(一般肥)	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注
(6) 小麦(多肥)	(2) 冬前作物	(3) 全氮 (%)	(4) 有机质 (%)	(5) C/N	(6) 备 注

Key:

1. Winter crops
2. Vetch
3. Winter bean
4. Rape
5. Wheat (ordinarily fertilized)
6. Wheat (fertilized in multiple amounts)
7. Organic matter left in the soil (jin/mu)
8. Nitrogen (%)
9. Organic carbon (%)
10. Remark: The organic substances left by vetch and winter bean include stem and leaf above ground and underground root system. Those left by rape include fallen leaves, fallen flowers and root stubbles. Those left by wheat include only root stubble. All are in wind dried weight.

Table 5. Effect of Different Winter Crops in Double Cropping Rice Fields Upon Accumulation of Organic Matter and Nutrients in the Soil (Soil content after harvesting the winter crop)

(1)	前作 (2)	有机质 (3)	碳 (4)	全氮 (5)	C/N (6)	水解氮 (7)	氮素供应强度 (8)	全磷 (9)	速效磷 (10)	速效钾 (11)	盐基代换量 (me/100克土) (12)
(2)	休耕 (对照)	2.412	1.899	0.120	11.6	0.013	10.6	0.092	10.12	30.0	8.16
(3)	萝卜	2.652	1.618	0.151	10.2	0.025	19.3	0.094	15.15	65.0	9.28
(4)	冬豆	2.637	1.529	0.141	10.8	0.024	17.0	0.094	14.15	60.0	9.36
(5)	油菜	2.416	1.400	0.115	11.9	0.018	12.8	0.103	16.25	55.0	8.60
(6)	小麦 (一般肥)	2.251	1.306	0.098	12.6	0.011	8.9	0.091	8.50	30.0	7.00
(7)	小麦 (多肥)	2.492	1.445	0.119	12.1	0.015	12.6	0.097	10.25	55.0	7.25

Key:

1. Forecrop
2. Fallow land (contrast)
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized in multiple amounts)
8. Organic matter
9. Carbon
10. Nitrogen
11. Hydrolyzed nitrogen
12. Intensity of supply of nitrogen
13. Whole phosphorus
14. Immediately effective phosphorus
15. Immediately effective potassium
16. Saline base conversion (me/100 grams soil)

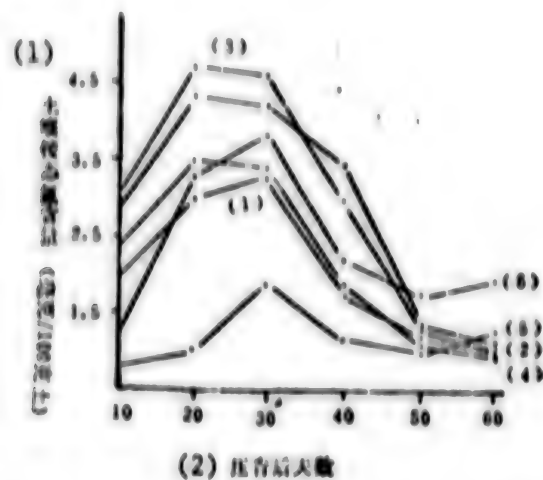


Figure 3. Variation in the Activity of Ammoniacal Nitrogen in the Soil of Early Rice Fields of Different Forecrops

Key:

1. Content of ammoniacal nitrogen in the soil (milligram/100 grams soil)
2. Number of days after plowing under as green manure

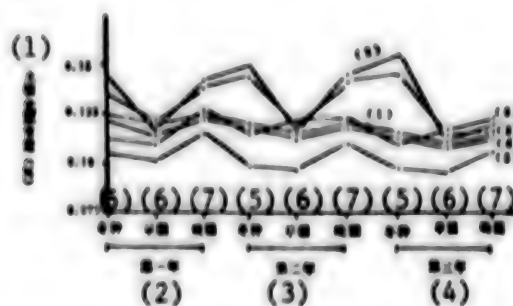


Figure 4. Effects of Different Multiple and Rotation Cropping Systems Upon the Changes in the Increase and Decrease of Nitrogen in the Soil.

Key:

1. Content of nitrogen in the soil (%)
2. First year
3. Second year
4. Third year
5. Winter planted crop
6. Early rice
7. Late rice



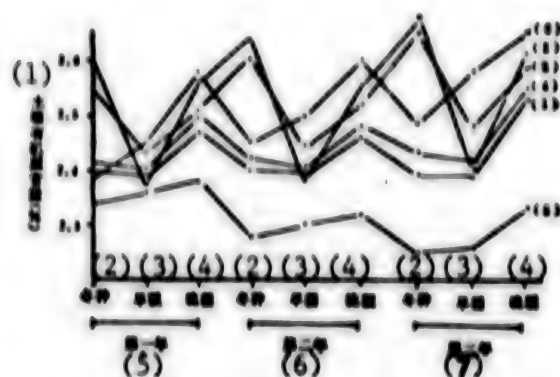


Figure 5. The Effect of Different Multiple and Rotation Cropping Systems Upon the Increase or Decrease of Organic Matter in the Soil

Key:

1. Content of organic matter in the soil (%)
2. Winter planted crop
3. Early rice
4. Late rice
5. First year
6. Second year
7. Third year

## 2. The Effect of Different Winter Crops Upon the Reducing Substances During the Growth Period of Early Rice

The aeration characteristics of the soil of different winter crops are different. These greatly affect the soil's oxidation reduction process. Analysis of the soil's reducing substances during the growth period of early rice (Table 6) shows that after plowing under vetch as green manure, the total amount of reducing substance in the soil is the highest. Of these, active reducing substances constitute 90 percent. Of the active reducing substances, the content of low iron is the highest (reaching 240 ppm). The content in winter bean fields is slightly lower than that in vetch yields. The content in wheat and rape fields is less than the contrast. According to field observations, when early rice is planted as a multiple crop in vetch and winter bean fields, the content of low iron is high, but there is no damage to early rice and the yield is increased. The reason may be because after green manure is plowed under, the soil is rich in nutrients, paddy rice grows prosperously, the oxidation strength of the root system is strong, and the plants can adapt to the high concentration of low iron and this can even be beneficial (such as eliminating the poisonous effect of sulphates). It seems that an abundance of ionic ferrous oxide is one factor of high yield of paddy rice.

### 3. Effect of Different Winter Crops Upon the Growth and Development of Microorganisms in the Soil

The types, numbers and intensity of activity of microorganisms in the soil are an important factor that affects the soil's fertility. In recent years, studies of the soil's microorganisms prove that highly fertile paddyrice fields have soil that contains large numbers of microorganisms and the soil's ammoniation and ability to decompose fibers are relatively strong. For different winter crops, the difference in tilling and planting, fertilization, techniques of cultivation, characteristics of the crops themselves, and the amount and quality (such as the C/N ratio) of organic matter remaining in the soil make the composition of the soil's microorganisms and their biochemical intensity vastly different. According to measurements of the tillering periods of early rice, (Table 7), the amount of organic matter left in the soil by vetch and winter beans is greater than wheat and rape, while the C/N ratio is very low, the numbers of ammoniating bacteria and bacteria that decompose fibers are higher than other treatments by 1 to 5 times. The amount of nitrogen-fixing bacteria also increases. But because a large amount of oxygen is consumed to decompose green manure, the amount of aerobic microorganisms greatly reduces, and denitrifying bacteria that are unfavorable to the accumulation of nitrogen in the soil increase in multiples. The amount of phosphorous bacteria in the soil of winter planted soil is higher than that of the contrast fields. In particular, the amount of phosphorous bacteria of winter planted vetch, winter beans and rape increases from 10 times to several dozen times more than the contrast. In wheat fields, the C/N ratio is high in the fields after planting wheat, and this is unfavorable to the growth and development of microorganisms, therefore the number of colonies of major microorganisms of bacteria that decompose fibers, ammoniating bacteria and nitrifying bacteria in the soil of fields after planting wheat greatly reduces. This causes poor nutritive conditions during the early period of growth of early rice following wheat. But the numbers of aerobic bacteria and phosphorous bacteria, whether the fields were fertilized ordinarily or fertilized by multiple amounts, all show visible increases over the numbers in the contrast dried under the sun after plowing and in fallow land. Therefore following wheat, phosphorous nutrients in the soil are activated.

**Table 6. Effect of Different Winter Crops Upon the Soil's Reducing Substances During the Growth Period of Paddy Rice**

(8) 早稻分蘖期土壤还原物质含量 (毫克当量/100克土)							
(1) 冬作物	(7) 还原物质总量	(9) 其中活性还原物质				(14) 非活性还原物质含量	(15) 活性还原物质占总量的百分比 (%)
		(10) 低	(11) 低	(12) 有机质	(13) 合计		
(2) 休闲	4.638	1.90	0.275	1.502	3.683	0.955	79.41
(3) 鸭绿	5.989	3.97	0.416	1.138	5.520	0.659	92.34
(4) 冬豆	5.651	3.42	0.378	1.011	4.814	0.837	85.19
(5) 油菜	4.026	1.85	0.348	0.730	2.930	1.096	72.77
(6) 小麦 (一般肥)	4.065	1.79	0.320	1.016	3.127	0.938	76.92

**Key:**

1. Winter crops
2. Fallow land
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Total amount of reducing substance
8. Content of reducing substance in the soil during the tillering period of early rice (milligram equivalent weight/100 grams soil)
9. Active reducing substance
10. Low iron
11. Low manganese
12. Organic matter
13. Total
14. Content of inactive reducing substance
15. Percentage of active reducing substance of the total (%)

Table 7. Effect of Different Winter Crops Upon the Microorganisms in the Soil of the Early Rice Fields (Unit: 100,000/gram dry soil)

(1)	冬作物	(8) 好气细菌	纤维分解 (9) 菌	好气固氮 (10) 菌	嫌气固氮 (11) 菌	(12) 氨化细菌	(13) 硝化细菌	反硝化 (14) 菌	(15) 磷酸菌
(2)	休 闲	1925.0	32.51	0.022	1.85	49.38	3.09	0.11	1.60
(3)	落 子	1460.0	89.12	0.018	2.43	200.73	1.59	0.24	11.59
(4)	冬 豆	2258.0	62.81	0.032	1.92	167.25	2.55	0.20	10.98
(5)	油菜	3350.0	38.11	0.019	1.85	50.00	2.47	0.19	98.77
(6)	小麦(一般肥)	2525.0	15.83	0.019	0.85	26.58	2.10	0.12	6.51
(7)	小麦(多肥)	2804.0	—	0.02	1.25	52.00	2.96	0.13	9.35

Key:

1. Winter crops
2. Fallow land
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized by multiple amounts)
8. Aerobic bacteria
9. Bacteria that decompose fibers
10. Aerobic and nitrogen fixing bacteria
11. Anaerobic and nitrogen fixing bacteria
12. Ammoniating bacteria
13. Nitrifying bacteria
14. Denitrifying bacteria
15. Phosphorous bacteria

Table 8. Effect of Different Winter Crops Upon Soil Structure  
(Savenov wet sift method)

(1) 冬作物	(8) 冬作物收获后土壤各类型团粒所占%				(13) 早稻晚稻轮作土壤各类型团粒所占%			
	(9) ≥3毫米	(10) 1-0.25毫米	(11) 0.25毫米	(12) ≤0.25毫米	(9) ≥3毫米	(14) 0.25毫米	(11) ≤0.25毫米	(12) ≤0.25毫米
(2) 休闲 (对照)	22.7	21.5	52.0	48.0	15.2	20.5	47.8	52.2
(3) 苕子	21.4	30.6	75.3	24.7	16.3	19.2	49.5	50.5
(4) 冬豆	21.9	25.8	69.2	30.8	15.9	20.4	50.0	50.0
(5) 油菜	21.5	16.8	47.0	53.0	14.8	20.8	46.8	53.2
(6) 小麦 (一般肥)	20.5	14.0	44.1	55.9	15.0	19.8	46.5	53.5
(7) 小麦 (多肥)	23.0	20.7	55.8	44.2	18.5	22.5	55.6	44.4

Key:

1. Winter crops
2. Fallow land (contrast)
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized by multiple amounts)
8. Percentage of various types of soil granules after harvesting of winter crops
9. 3 millimeters
10. 1 - 0.25 millimeters
11. 0.25 millimeters
12. 0.25 millimeters
13. Percentage of various types of soil granules after multiple planting of early and late rice.
14. 0.25 millimeters



Table 9. Effects of Different Winter Crops Upon Soil Capacity and Aeration

(1) 冬作物	(8) 冬作收后土壤					(15) 晚稻收后土壤				
	(9)	(10)	(11) 三相比例 (%)			(9)	(10)	(11) 三相比例 (%)		
	土壤容重 (克/cm <sup>3</sup> )	总孔隙度 (%)	(12) 固相	(13) 液相	(14) 气相	土壤容重 (克/cm <sup>3</sup> )	总孔隙度 (%)	(12) 固相	(13) 液相	(14) 气相
(2) 休闲	1.351	49.1	50.9	24.5	24.6	1.301	49.7	49.0	31.9	17.8
(3) 苜蓿	1.352	48.4	51.6	29.5	18.8	1.242	52.4	47.6	28.6	23.6
(4) 冬豆	1.321	50.2	49.9	23.7	26.2	1.281	51.7	48.3	29.2	22.6
(5) 油菜	1.321	50.3	49.7	24.4	25.9	1.290	51.3	48.6	32.3	19.0
(6) 小麦(一般肥)	1.321	50.3	49.7	25.0	25.3	1.392	48.9	53.1	27.7	17.2
(7) 小麦(多肥)	1.302	51.0	49.0	25.0	26.0	1.282	50.8	49.2	30.8	20.0

Key:

1. Winter crops
2. Fallow land
3. Vetch
4. Winter bean
5. Rape
6. Wheat (ordinarily fertilized)
7. Wheat (fertilized by multiple amounts)
8. Soil after harvesting winter crop
9. Soil capacity (gram/cm<sup>3</sup>)
10. Total porosity (%)
11. Proportions of the three states of matter (%)
12. Solids
13. Liquids
14. Gases
15. Soil after harvesting late rice

#### 4. Effect of Different Winter Crops Upon Soil Structure

Table 8 shows that after planting vetch and winter beans in winter, the soil structure improved. After planting wheat in winter (ordinarily fertilized), the soil structure was damaged. The number of soil granules in the vetch field  $> 0.25$  millimeters showed an increase of 44.8 percent over those in the contrast fields, and an increase of 48.07 percent over those in the wheat fields. The number of soil granules in the winter bean fields  $> 0.25$  millimeters showed an increase of 30.07 percent over those in the contrast fields while the number of soil granules  $> 0.25$  millimeters in the wheat field was less than that in the contrast by 18.9 percent. After planting early rice as a multiple crop the effect of different winter crops upon the soil structure was not great. Vetch and winter beans do not visibly improve the soil structure of the rice field but are related to the reduction of organic matter in the soil.

#### 5. Effect of Different Winter Crops Upon the Soil's Aeration

Table 9 shows that the soil's capacity, the soil's porosity, and the percentages of the three states of matter are related to the content of organic matter in the soil, the quality of the soil structure, and are also affected by tilling, fertilization and penetration of the root system of crops. After harvesting wheat, the organic matter in the soil reduces, the soil's structure is poorer, but by tilling, fertilization and penetration of the root system of the crops, the capacity of the soil drops, porosity increases, and aeration in the soil is improved. Although vetch fields contain more organic matter and the soil structure is better than the contrast field and wheat fields, because of a lack of winter tilling, the soil's aeration is still rather poor. But after planting paddy rice as a multiple crop, the soil's capacity drops, and the soil's porosity and aeration are elevated. This is because after planting paddy rice as a multiple crop and under the same conditions of fertilization and plowing and planting of the same crops, the soil's content of organic matter leads soil capacity and porosity. At the same time, early rice planted in vetch fields produces a high yield, the root system is abundant, remnant organic matter in the soil is plentiful, and prosperous root systems penetrate the soil, increase porosity of the soil and improve the condition of aeration.

#### Conclusion

(1) Winter planting of vetch as green manure in double cropping rice fields has a visible effect upon increasing yield of early rice. The increase in yield is 21.11 percent over that of the contrast fields and 50.5 percent over that of fields planted with wheat in winter (fertilized ordinarily). The total yield of food grains for the entire year, the amount of food grains produced by each jin of nitrogen, the amount of food grains produced by each working day and the cash revenue are all highest for winter planted vetch fields, showing respective increases of 11.63

percent, 5.47 jin, 2.5 jin and 0.24 yuan over those of the contrast fields and 8.8 percent, 3.6 jin, 15.5 jin and 1.1 yuan over those of wheat fields (fertilized ordinarily). But vetch as green manure does not increase the yield of late rice.

Winter planting of vetch as green manure has a visible effect of nourishing the soil of the current planting season. It raises the content of nitrogen of the soil, activates phosphorus and potassium nutrients in the soil, accumulates organic matter, strengthens the soil's ability to retain fertilizers, and improves the soil's structure. But after planting paddy rice as a multiple crop, the effects of vetch in accumulating organic matter in the soil and improving the soil's structure are not obvious.

(2) Planting of winter beans (semi-green manure) in winter in double cropping rice fields can increase one food grain crop, and can also nourish the soil. Their stems can be returned to the soil and can produce a relatively visible increase in yield of early rice planted as an aftercrop. The increased yield can reach 14.4 percent more than that of the contrast and 42.3 percent more than that of wheat (ordinarily fertilized). But the yield of late rice is not affected.

(3) Planting of rape in winter in double cropping rice fields causes the early rice planted as aftercrop to yield basically the same as that of the contrast but an additional crop of oil can be harvested and the soil can be nourished and utilized fully.

(4) Winter planting of wheat in double cropping rice fields causes the early rice planted as an aftercrop to reduce its yield by 15.6 percent and late rice to reduce its yield by 3.7 percent. The total yield of good grains of the entire year is about the same as that of the contrast. The amount of food grains produced by each working day and the cash revenue are respectively lower than those of the contrast by 44.2 percent and 82.5 percent. Although applying multiple amounts of fertilizers can raise the total yield, more work is needed, the investment is large, and the amount of food grains produced by every jin of nitrogen is lower than that of the contrast by 58.9 percent. The amount of food grains produced every working day and the cash revenue drop respectively by 33.3 percent and 153.3 percent. The cost to produce each jin of food grains increases from 0.055 yuan to 0.08 yuan.

Winter planting of wheat severely exhausts the soil's fertility, causing the amount of organic matter in the soil to drop below that of the contrast by 7.1 percent, and the amount of whole nitrogen to lessen by 22.4 percent. During the growth period of early rice planted as an aftercrop, the content of ammoniacal nitrogen in the soil is less by over onefold than the contrast. Although applying a multiple amount of fertilizers can sustain the equilibrium of nutrients in the soil, the economic benefits are poor. Therefore it is believed that only in those places where double cropping rice has a very high yield and further elevation of unit

area yield is relatively difficult and where labor and fertilizers are sufficient can the triple cropping system of rice-rice-wheat which mainly depends on the soil be used. Inappropriate use of the triple cropping system of rice-rice-wheat and neglecting the long range relationship of continued increases in yield year after year and the reduction of the area of green manure used to nourish the fields will cause soil fertility to drop year by year and thus limit continued increases of paddy rice and other food grain crops.

9296

CSO: 4007

## AGRICULTURAL AERIAL SERVICE TEAM SERVES ANHUI

Beijing GUANGMING RIBAO in Chinese 5 Jul 80 p 2

[Article by Hang Yan [2635 1484] and Hu Youquan [5170 2589 3123]: "Our Nation's First Agricultural Aerial Service Team Eradicates Forest Insects"]

[Text] The first and newly organized agricultural aerial service team of our nation recently conducted an operation to spray superflow concentration chemicals over an area of 112,000 mu of forests in Anhui Province to prevent damage by the wintering generation of pin moths. This has opened up a new field for the use of airplanes in agriculture in our nation.

The 112,000 mu of forests that have been seriously damaged by the pine moth belong to the Shahe Central Forestry Yard and the Jiashan County Forestry Bureau. Last year, 40,000 to 50,000 mu of forests of this yard and this bureau suffered serious damage by the pine moth. In May of last year, over 170 people were mobilized to spray chemicals. They spent over 20 days to spray 6,000 mu. The percentage of eradication of the insects was only about 60 percent. Large areas of forests still received severe damage.

In April of this year, our nation's first agricultural aerial service was founded. Two "yun II" model airplanes were sent to the above forest regions to conduct spraying operations of chemicals of superflow concentration. They covered an area of 112,000 mu. Ground surveys conducted by the forestry departments proved that the airplanes flew 55 missions to spray chemicals and spent over 70 hours in the air. The percentage of eradication reached 93 percent. The speed of eradication of insects was quick. The cost was low. The cost of spraying one mu averaged 8 jiao less than the cost of spraying by men. A lot of labor and farm chemicals were also saved. Therefore, the efforts were unanimously praised by the local masses and the comrades from the forestry bureaus of six provinces and regions who observed the operations.

9296

CSO: 4007



COMMUNE-RUN ENTERPRISES URGED TO RESPOND TO MARKETS

Guangzhou NANFANG RIBAO in Chinese 26 May 80 p 1

[Article by Ni Changjiang [0242 7022 3068], Zhu Zhenzhong [2612 2182 0022], and He Zhenlu [0149 2182 2464]: "Jiancheng Commune's Commune-Operated Enterprises Show Great Increases in Production Year After Year by Applying Market Adjustments and Broadening Production Avenues. Commune Organizes a Marketing Unit Versed in Business With an Undertaking of Market Conditions To Market Fixed Amounts of Goods and Bring About Thriving Sales of Many Goods Both Domestically and Abroad"]

[Text] Editor's Note: Jiancheng Commune in Yunan County, the recipient of a commendation from the State Council, has greatly increased production year after year. Operating under the guidance of the state plan, it mastered market conditions, set up production, and made the fullest use of adjustments in the market to fill commune-operated enterprises with booming vitality.

One of the main reasons why Jiancheng Commune is able to do such a good job of using market adjustments to develop production and expand the avenue to prosperity is that it has a technical marketing unit that has adhered to the socialist path, understands its business, understands technology, and is good at doing business. This unit gets out of the plants, solicits the opinions of consumers, checks market tendencies, makes specimens locally, consults person to person, and clinches deals on the spot. These actions play an important role in keeping marketing channels open, in eliminating blind production, and in improving economic effectiveness. But when the "gang of four" was on the rampage, these proper marketing activities were unreasonably stigmatized as "black marketing" and were criticized without further ado. As a result, some comrades harbor lingering fears to this day. We hope that every locality will study the experiences of Jiancheng Commune; will continue to purge the pernicious influence of the ultraleftist line; and will build a

healthy marketing unit in order to make the most of the smallness, flexibility, and adaptability of commune and brigade enterprises and make the marketing by commune and brigade enterprises thrive.

The Jiancheng Commune in Yunan County has made adherence to planned adjustments paramount, making the most of market adjustments in order to broaden production lines. As a result, commune-operated enterprises have seen a new growth in the process of the readjustment of the national economy as markets are being opened both domestically and abroad for large amounts of goods. Last year, the total output value of commune-operated enterprises increased another 34 percent over the previous year to cap previous increases for 4 years in a row; and the Jiancheng Commune was cited as an all-China advanced agricultural unit and was given an award by the State Council. This year, it continued to advance. Total output value for commune-operated enterprises for the first quarter increased 19.4 percent over the same period last year.

Jiancheng Commune used to be a poor mountainous region of numerous people, few fields, and scant resources. Beginning in 1975, by using the resources of the mountain region, they operated 25 work sites which processed bamboo and wood as agricultural sideline products, producing more than 180 different items. By 1978, the total output value of commune-operated enterprises had increased 5.1 times over 1975, for an average annual increase of 83 percent. They took in a profit of 840,000 yuan, which was 7.6 times more than 1975. But as the market changed and with the onset of last year's readjustment of the national economy, they encountered a series of new problems. The products of some plants moved slowly, and production jobs for some other plants were insufficient. For these reasons, they set up a marketing management department for commune-operated enterprises, staffed by cadres who were good businessmen, versed in their field, and understood technology. They used the survey and the study of the market to gain an understanding of the trends in the marketplace, they promptly stopped the production of goods which were glut on the market; and they quickly produced goods in short supply. For example, this commune's wooden handicrafts plant had been using bits and pieces of wood to produce abacuses, but after a time the market for abacuses decreased, and in 1978 they began to lose money. In order to find new outlets, the commune sent personnel to Wuzhou and Guangzhou to see what was in demand. They discovered that the Wuzhou Enamel-Insulated Wire Plant needed large quantities of wooden cores on which to wind their wire, and that the Guangzhou Handicrafts Plant needed stands for flower vases and hinged supports for plates and bowls. They set up a marketing relationship with them and set to work at once to organize production. Last year the output value of these items amounted to more than 70,000 yuan, for a net profit of more than 10,000 yuan, and a passive situation was transformed. In another example, the commune's electric motor plant used to produce various models of motors ranging from 8000 watts to 120 kilowatts, which were sold in six provinces and municipalities, and which enjoyed a reliable reputation. Beginning in 1978, more and more places began to produce identical electric motors,

and sales became sluggish. By the beginning of last year, the demand was insufficient. Subsequently, in the course of a survey, they discovered that there were numerous small hydroelectric power stations in rural villages in Guangxi where the flood peak was low and which urgently needed slowly revolving electric motors. They, thereupon, figured out a way to overcome technical difficulties to test manufacture two types of electric motors suited to the needs of low flood peak hydroelectric power stations. They were well received by customers and a flurry of telegrams and letters ordering the motors arrived. Because of the product's excellent reception and its broad market, almost 300 various types of motors were marketed last year in nine provinces and regions.

The Jincheng Commune's commune-operated enterprises also gave attention to all trade channels and to understanding the international markets. They managed through every means to get more of their products into the international market. Formerly, the commune canning plant exported bamboo shoots canned only in fresh water. Last year, they learned from the foreign trade authorities that there was a strong market for canned bamboo shoots; so, in addition to continuing to produce bamboo shoots canned in fresh water, they also began to can all sorts of salted bamboo shoots using jiti [7741 6437] bamboo shoots, maozhu [3029 4554] bamboo shoots, pu [5543] bamboo shoots, and niujiao [3662 6037] bamboo shoots. As a result, they were marketed as far away as Japan. Last year, the output amounted to more than 50,000 yuan. The handicrafts plant used to produce woven bamboo wares and depended solely on foreign trade for work. As a result, it "didn't have enough to eat" for a period. Subsequently, the plant manager himself went to Guangzhou to attend the export commodities trade fair and to look at the trends in the market. He discovered that foreign traders bought a substantial amount of birds and required large numbers of bird cages. He immediately notified the plant to make up some bird cage samples and bring them to the trade fair. In a single transaction, he got 6 months work and reversed the situation from "not having enough to eat."

They used adjustments in the market to develop production and to get commune-operated enterprises to put more effort into increasing the designs and colors of their products, to improve the quality of the merchandise, and to lower production costs, as well as to think of ways to improve the competitive position of the products. Many enterprises set up units on design, patternmaking, and test manufacturing, of new products. The rain hat plant was overstocked for a time, but after the technical unit made innovations and improved the quality of the merchandise, markets were found. At the same time, the plant test manufactured new articles such as bamboo steamers and wicker baskets, which sold well in Nanhai, Panyu and Guangzhou. The test manufacturing unit of the handicraft's plant heard that woven bamboo articles in the shape of various animals enjoyed brisk sales in the international market, and over the period of a year it test manufactured 107 different kinds of frogs, dogs, turtles, and kangaroos, 50 varieties of which foreign traders ordered. Foreign traders placed orders for 10,000 wastepaper baskets in the shape of a frog at 6 yuan each.

9432

CSO: 4007

GUANGDONG FORESTRY ACCOMPLISHMENTS, FUTURE TASKS SUMMARIZED

Guangzhou NANFANG RIBAO in Chinese 2 Jun 80 p 2

[Article by Zheng Qun [6774 5028], Director of the Guangdong Forestry Department: "Carry Out the Party's Policies for the Speedy Development of the Forestry Industry"]

[Excerpts] Numerous accomplishments have been made in building the forestry industry in our country since the founding of the People's Republic. According to a survey, the area afforested throughout the Guangdong Province amounts to 61 million mu, which, when added to the existing forests and new areas, brings the forested area of more than 55 million mu of the early period following Liberation to the present 110 million mu. Trees planted in the "four sides" green campaign of afforestation have numbered 176 million. The replanting rate for the forests has risen from 17.6 percent to 33.9 percent, and the reserves of standing trees have increased from 153 million cubic meters to 176 million cubic meters. The state has been provided with 45 million cubic meters of timber; more than 1.5 million tons of turpentine, more than 260,000 cubic meters of building board, and more than 600 million yuan of accumulated capital have been achieved.

Despite this situation, however, the forestry industry in our province is currently still a long way away from satisfying the needs of the Four Modernizations in construction, and numerous problems still exist. Stated summarily the problems are of two kinds: First is a scarcity of forest resources, plus their constant destruction with a gradual loss of balance in the ecology; and second is a serious imbalance in proportional composition within the forestry industry.

The main manifestation of the scarcity of forest resources is a poor situation in the forests and a low production rate. Though forests cover more than 110 million mu throughout the province, total reserves amount to only 165 million cubic meters of timber, which is an average reserve of only 1.6 cubic meters of timber, which is an average reserve of only 1.6 cubic meters per mu. Annual production per mu amounts to only 0.063 cubic meters, which is lower



than both the national average and the average of the principal forestry nations of the world. Moreover, inasmuch as the distribution of forestlands, the distribution of tree varieties, and the age spread of the trees is uneven and unsuitable, fullest benefit cannot be derived from the forests.

Forest resources were scant to begin with, and they have suffered serious continued destruction. For a rather long period, reckless and wanton cutting of timber has been very serious in our province, and it still has not been stopped in some places. In many places there is excessive cutting of young and medium-age trees, greatly exceeding planned production of lumber. A 1978 survey showed annual consumption of forest resources throughout the province to be more than 9 million cubic meters, while annual forest growth amounted to only 7 million cubic meters, thus, consumption was exceeding growth. Because forest resources are scant and subject to constant destruction, a gradual loss is taking place in the ecological balance, which could result in a series of evil sociological consequences.

Mustering the enthusiasm of the broad masses, hastening the pace of building the forestry industry in Guangdong, and rapidly greening Guangdong's good earth will require that we do many things, of which the following tasks must be taken in hand now.

1. A stable system of ownership with the implementation of forestry policies: The forestry industry is characterized by long growing periods and long periods for the circulation of capital. These two "long periods" make the forestry industry extremely sensitive to changes in the system of ownership. At the first sign of trouble, the forests are first to be affected. As a result of the disturbances caused by the ultraleftist line, production relationships in forest areas have been turbulent for many years, and the organization and policies have undergone many changes.

Forestry production has been repeatedly tossed around to the serious despair of the masses. The experiences of history tell us that for the forest industry, a stable system of ownership is extremely important. The existing ownership rights to the trees in mountain forests by the state, by collectives, and by individual commune members must be resolutely upheld. These rights require reiteration in some places with the reissuance of mountain forest certifications by the county people's government. This was necessary in some counties, such as Lianshan and Yangshan, and in some communes; as a result, the initiative of the masses there in for planting and protecting trees is very high.

2. Adjustment of proportions: Proportional imbalance in the national economy is reflected in the forestry industry in two important ways. One is the proportional imbalance between the forestry industry and the national economy and between the forestry industry and agriculture. Second is the proportional

imbalance of the economic structure within the forest industry. Therefore, in any readjustment, emphasis must be given to handling these two proportional relationships to achieve two combinations, one of agriculture, forestry, and livestock raising, and the other of forestry, industry, and commerce.

There are almost 200 million mu of land used by the forestry industry in our province, amounting to about 60 percent of the total land area, and more than three times the cultivated land area. The growth period for the forests, moreover, is much longer than for agricultural crops. Nevertheless, during the decade of the 1970's, investment in capital construction in the forestry industry amounted to only 2.5 percent of the capital investment throughout the province, and investment in the forestry industry amounted to only 7.3 percent of that invested in agriculture. These proportions are obviously very ill matched. Water conservancy is the lifeblood of agriculture, and forestry is the fountainhead of water conservancy. A combination of agriculture, forestry, and livestock raising and the tackling of the problems of mountains, rivers, farmlands, forests, and roads in a comprehensive way accurately reflects objective laws. Working on grain production alone or working on the problems of earth and stone alone is not in accordance with the laws of nature, nor is it in accordance with the construction of modern agriculture. Therefore, when proportional readjustments are made in agriculture, an increase in the amount of investment in forestry is in accordance with objective requirements and with the overall interests of agriculture itself.

3. Reform the forestry and forest work system: Numerous maladies exist in the planning and management systems of the forestry industry and forestry work. As with other industries, they face the problem of how to implement readjustment and reform. Reform of the system means readjustment of production relationships and the part of the superstructure that is not rational, which has broad ramifications. A single link affects the situation as a whole. It is necessary to proceed actively and confidently in the direction of reforming the national economic system, entering upon the correct road, after taking the first step toward reform and avoiding any detours. The instructions of the Central Committee of the Chinese Communist Party and of the State Council point out: "Comprehensive operation of forestry, industry, and commerce is the direction toward building our country's modernized forestry industry." The reform of the forestry industry system must proceed in this direction. Consequently, there has to be a thorough investigation and study from which a reform program can be formulated. Additionally, there should be an active establishment of test points with a conscientious summarization of the experiences of these test points in order to find a way to implement reform.

4. Overall planning and a rational pattern: We must formulate a 10-year plan for the development of the forestry industry, set the economic and technical criteria for the development of the forestry industry, and gradually



change the economic structure within the forestry industry in a planned and gradual way. We must diligently institute economic divisions in the forestry industry and the plans for land utilization, rationally set a course of operation, the categories to be engaged in, and the various kinds of forests and kinds of trees. We must also lay out overall categories for the use of various kinds of lumber, the scope, and the capacity of equipment so that the building of our provincial forestry industry will have a sensible plan and clear combat objectives.

5. Genuine protection of forestry resources: Large scale reckless cutting of timber that drastically reduces forest resources and increases the baring of mountains and barren land is a serious problem which merits serious attention. Therefore, it is a most urgent task to undertake effective measures to stop this reckless cutting and wanton felling of trees.

9432

CSO: 4007

GUANGDONG SERICULTURAL DEVELOPMENT LAGS BEHIND

Old, New Areas

Guangzhou NANFANG RIBAO in Chinese 27 Apr 80 p 2

[Article by Hai Jin [3189 2529] and Shi Fangdong [2514 5364 2639]: "Developing Both New and Old Areas of Sericultural Production; New Development of Our Province's Sericultural Production Is in View"]

[Text] Our province's sericultural production has a long history. For many years, however, development has been slow. In 1978, the province's total production of cocoons was 456,000 dan, an increase of only 40 percent compared to 1974. The rate of development lags far behind that of Sichuan and Shandong provinces, and total production is far below our province's record of 1.5 million dan in 1922.

How can we hasten our province's development of sericultural production? We believe that in addition to implementing the Party's policies and guidelines and developing scientific sericulture in old areas of sericultural production, new bases for sericultural production must be expanded and production levels in new areas must be expanded. The reasons are as follows:

1. New sericultural areas have sufficient soil resources and manpower resources. The entire province now has a total of 187,600 mu of mulberry trees. Of this, 85 percent are concentrated in the Pearl River Delta in the six countries of Shunde, Nanhai, Zhongshan, Sanshui, Gaohe and Xinhui. There are many people and less land in these old sericultural regions. The burden of producing commercial food grains and other economic crops is heavy. It is difficult to squeeze out more land for mulberry trees. The remaining counties, with 31 sericultural areas, have a total of slightly more than 30,000 mu of mulberry trees. In these new regions and counties, although most have many people and less land, there is plenty of dry slopeland, hilly land, river beaches and "lands of the five sides" which can accommodate mulberry trees. Development potential is great.

2. New sericultural regions have a great potential for increasing unit production. Last year, the average yield of cocoons per mu of mulberry trees throughout the province was 240 jin. The unit production of the new sericultural regions was less than half the provincial average. Such a low yield indicates great potential for increased yield. In recent years, a movement to achieve high yields in each of the sericultural areas in the Zhangjiang region has been launched. The production of cocoons per mu of mulberry trees increased from 715.5 jin in 1974 to 174.3 jin in 1978. If all the new sericultural areas could launch a movement to raise silkworms and produce cocoons while raising more mulberry trees, the entire province's sericultural production could be developed greatly.

3. New sericultural areas have the enthusiasm to develop sericultural production. Planting mulberry trees and cultivating silkworms is a low-cost, high-value industry with high income. The masses in the new sericultural regions have realized that developing sericultural production is an important way to become rich.

First, planting mulberry trees and cultivating silkworms stimulates food production. Calculated on a medium-production level, using one-tenth of land under mulberry trees to cultivate silkworms will produce 24 jin of cocoons annually. When sold to the state, this earns 30 yuan and 45 jin of chemical fertilizers as a reward. It also produces 90 jin of silkworm excrement. One-third of all this is returned to the mulberry fields. The remaining 30 jin of chemical fertilizers and 60 jin of silkworm excrement can be used in rice fields. The masses have said: "Planting 10 percent of mulberry supports one mu of fields."

Second, developing sericultural production requires less investment. The production cycle is short. Results are quick. Mulberry trees planted this year can be picked in the same year. Sericulture produces 6 batches of cocoons a year. Each batch can be sold immediately. Capital transfer is quick. The masses say this is like "blowing away the husk and seeing the rice". It is not necessary to wait hopefully from the beginning to the end of the year.

Also, methods of managing sericulture and production are versatile. Sericulture can be collectively managed and it can also be managed by individual families. "One man can grow 100 mulberry trees; one family can cultivate one bed of silkworms. After deducting costs, earnings amount to 100 yuan." In addition, planting mulberry trees and cultivating silkworms also provide an outlet for surplus and supplementary labor.

At present, raw silk is our nation's second largest single export commodity, following petroleum. The amount exported far from satisfies the needs of the international market. Greatly developing sericultural production can

strengthen the collective economy, increase income of commune members, and have important significance in supporting light textile industries and foreign trade exports. The potential for developing production in our province's new sericultural regions is great. As long as leadership is conscientiously strengthened and can help solve concrete problems in production, a great leap forward in our province's sericultural production can be foreseen.

#### Lianjiang County

Guangzhou NANFANG RIBAO in Chinese 27 Apr 80 p 2

[Article by Qi Yirui [2058 0001 3843]

[Text] Lianjiang County is greatly developing sericultural production. The entire county plans to plant 20,000 mu of mulberry trees. Large amounts of cultivated seedlings are now being sown and more than 4,800 mu of mulberry trees have already been planted.

To rapidly develop sericultural production, the county committee has taken the following steps:

The first is to conscientiously grasp the work of building the sericultural demonstration area of the Heti, Longwan and Hengshan communes, to seek experience, and to organize propagation work.

The second is to hire more than 70 old sericulturists, paid and fed by the county, to go to each commune production brigade to instruct and train a preliminary team of more than 200 sericultural technicians.

The third is to help those production brigades which lack capital to develop sericultural production by providing investments and bank and credit union loans. The county has also sent cadres to other provinces to obtain massive amounts of mulberry seedlings and varieties of silkworms to supply each production brigade.

The fourth is to strengthen leadership. Commune production brigades that plant mulberry plants and cultivate silkworms all have leading cadres to improve this work. The major responsible comrades of the county committee, agricultural offices, agricultural bureau and external trade bureau all personally participate in improving sericultural production. They frequently investigate and study to help commune production brigades solve actual production problems.

The fifth is implementation of the responsibility system in sericultural production. The county committee and the concerned departments are summarizing experiences in implementing the responsibility system in sericultural production to achieve high yields. They are propagating their findings throughout the province.

## Foshan Region

Guangzhou NANFANG RIBAO in Chinese 27 Apr 80 p 2

[Article by Wu Jiongwei [0702 3518 5588]]

[Text] The Foshan region is making efforts to beef up and elevate old sericultural regions. At the same time it is taking concrete steps to develop production in new sericultural regions.

Foshan region's newly developed sericultural regions are part of the regions of the commune production brigades of the three counties of Taishan, Kaiping and Enping. There are many dry slopelands, "five side lands" and some low yield fields and lowlands in Yuanlang to accommodate mulberry trees and sericulture. To help these new sericultural regions rapidly elevate production, the Foshan region has allocated some steel construction materials for buildings to house silkworms in these new sericultural regions. The county and the commune also allocated local funds as subsidies or bank loans to help production teams purchase silkworms and mulberry seedlings.

Since last autumn, these three counties have planted 6,000 mu of mulberry trees.

At present, the new regions are improving work to transplant seedlings and to strive towards planting mulberry trees, cultivating silkworms and harvesting a yield all in one year.

9296

CSO: 4007

## BRIEFS

**ZHAOQING PREFECTURE FARM EXPORT**--Zhaoqing Prefecture in Guangdong Province has set up more than 1,200 export commodity bases with a crop growing and fish breeding area totalling more than 1 million mu to provide more than 30 kinds of export commodities. Zhaoqing Prefecture has numerous varieties of special native products of which the staples are cinnamon, bay oil, li (0622) bamboo, tea, xianggu mushrooms, and turpentine, which are marketed in more than 50 countries. Now Gaoyao, Deqing, Yunan, and Luoding counties on the banks of the West River have set up 20 cinnamon and bay oil bases totalling more than 590,000 mu in the Gui Mountains with cinnamon output of more than 6,000 tons, and a bay oil output of 50 tons annually. In the mountain counties of Fengkai, Huaiji, and Deqing, more than 150 xianggu mushroom production bases have been set up with an annual output of more than 150 tons of xianggu mushrooms. In Luoding, Yunan and Deqing counties, 17 silkworm and mulberry bases have been set up. The mulberry groves cover more than 27,000 mu and have an annual output of more than 10,000 dan of silkworm cocoons. They have also set up a filature plant to produce raw silk for export. Throughout the prefecture, more than 50 tea production bases and seven li bamboo production bases have been established. In the past several years, the cattle and poultry raising industry has also expanded greatly. More than 200 chicken farms have been established, specializing in raising the local superior varieties, "sanhuang" (0006 7806) and "xinghua" (2622 5363) chickens. More than 400,000 live chickens are exported annually. At Sihui and Gaoyao, in the waterlands of the lower reaches of the West River, bases have been established for force-fed ducks and geese. Annual exports of ducks and geese run to more than 200,000. In the mountainous regions of Gaoyao, Sihui, Xinxing, and Yunfu, bases for the production of vegetables, pond fish, and medical materials have been set up to provide commodities for export. [Text] [Hong Kong ZHONGGUO XINWEN in Chinese 10 May 80 p 4] 9432

**NANHAI COUNTY SPRING SILKWORMS**--Nanhai County, "the land of silkworms and mulberries" in Guangdong Province, greatly increased the output of spring silkworm cocoons in its first crop this year. The state procurement station has purchased spring silkworms valued at more than 1.68 million yuan, an increase of 17.7 percent over the same period last year. Nanhai County has a long history of growing mulberry trees to raise silkworms.



Conditions are good for this, and eight crops may be grown annually. Since the advent of spring this year, the amount of mulberry leaves produced by the more than 30,000 mu of mulberry trees throughout the county has doubled over that of last year. Of these, 8800 mu of superior variety mulberry trees produced more than 20 percent more leaves than the common jing [5427] mulberry. The increase in the amount of mulberry leaves provided ample feed for the spring silkworms. [Text] [Hong Kong ZHONGGUO XINWEN in Chinese 12 May 80 p 11] 9432

CSO: 4007

## BRIEFS

BRIGADE RAPESEED OUTPUT--Zhile Brigade, Yanling County, Henan Province, this year had a total rapeseed output of 450,000 jin, up 280,000 jin from 1979, and amounting to an average yield of 225 jin per mu. After reserving enough seeds for the next crop and for commune members' cooking oil, 400,000 jin was turned over or sold to the state, and in one season it completed an oil sales quota equivalent to that for 27 years, realizing an income of 216,000 yuan, averaging 70 yuan per commune member. In 1978 Zhile Brigade found this way of making its fortune. It has 7,500 mu of collective farmland. In the past, every year it planted about 4,800 mu of wheat and kept about 2,000 mu of winter fallow field in preparation for the next year's planting of fall grains. After the Third Plenary Session, the party's policies were relaxed and the masses took a broader approach to their farming work. They analyzed the brigade's situation of large land area and much winter fallow land and decided to put the fallow fields to work in winter. That year they experimented with planting 720 mu of rapeseed, and in 1979 they harvested 166,000 jin. At that point everyone's interest in planting rapeseed became greater, and in the same year all of the brigade's more than 2,000 mu of autumn-harvested land was planted to rapeseed. [Text] [Beijing RENMIN RIBAO in Chinese 25 Jun 80 p 2] 8480

CSO: 4007

## HYBRID RICE PROVES ITS SUPERIORITY

Beijing RENMIN RIBAO in Chinese 28 Jun 80 p 2

[Article: "The Cultivation of Hybrid Rice Is Getting Better and Better in Hengyang Prefecture"]

[Text] In Hengyang Prefecture, Hunan Province, the cultivation of hybrid rice is getting better and better. Last year the total area in the prefecture planted to hybrid late rice reached 2.57 million mu, about a sixth of the total hybrid late rice acreage in the province. In the last 4 years when hybrid late rice was planted in large areas, the yield per mu increased an average of 40 jin a year, almost the same as that for early rice. This year the seedling conditions of the spring planted hybrid rice were rather good, and the cultivation of late rice seedlings has already begun.

In Hengyang Prefecture, 85 percent of the arable land is planted to paddy rice, and double-cropping rice accounts for 96 percent of the total rice paddy acreage. For a long time, yields of late rice had been low and unstable. In 1975, experiments were started here with 4 mu of hybrid late rice, and the yield per mu was 852 jin. The next year this was expanded to 500,000 mu, and the yield per mu was more than 680 jin, over 200 jin higher than for ordinary rice. In 1977, hybrid late rice spread quickly through the prefecture, accounting for 76 percent of the total late rice acreage. Last year, although the late crops encountered a serious drought, the hybrid rice still yielded 639 jin per mu. The per-mu yield of late rice in Hengdong and Hengshan counties was higher than for early rice.

Hybrid rice is a superior cross between a sterile line, a sterile-free line and a restorer line. To expand it over a large area, it is first necessary to produce the seeds in two steps: i.e. in the spring the sterile line is crossed with the sterile-free line to produce sterile seeds; in the fall the sterile and restorer lines are crossed to produce the hybrid rice seeds. Initially people were sent from here to Hainan Island and Nanning to carry out the second step; but since 1976 both steps have been done here. In order to guarantee seed quality and quantity, every county adopts two methods: have both steps performed by the

county or let the county perform the first step and the communes the second. Each county's seed company signs a seed breeding, purchase and supply contract with the seed production units. The entire prefecture also established unified seed price and grain conversion standards so as to allow the seed producing units to get a reasonable profit. In this way, responsibilities are clear, and sales are reliable. In the last 3 years, 7 million jin of seeds were produced a year, and thus quality and quantity have been assured.

In order to grow the hybrid rice successfully, all of the counties in Hengyang Prefecture have carried out technical training before each year's spring operation and fall operation of seed production and have trained a total of more than 30,000 peasant technicians. This year the technical force of the seed farms in each county has been augmented, the responsibility system has been strengthened, and further success has been obtained in increasing the purity and vigor of hybrid rice.

8480

CSO: 4007

JIANGSU'S AGRICULTURE IN THE SEVENTIES REVIEWED

Hong Kong ZHONGGUO XINWEN [CHINESE NEWS] in Chinese 28 Mar 80 pp 1-2

[Text] China News Agency, Nanjing, Mar 27--Jiangsu Province's agriculture continues to increase production in the 1970's.

During the 10 years from 1970 to 1979, the total value of agricultural production in Jiangsu Province averaged an annual increase of 6.8 percent, much higher than that of the 1950s and 1960s. During these 10 years, Jiangsu Province has become a province with a higher level of agricultural production with a higher level of commercial products. It is a province that has contributed much to our nation.

During the past 30 years, food grain production in Jiangsu Province has more than doubled. Cotton production has increased more than 17 times. Edible oil production has increased 1.4 times. The number of domestic hogs has increased more than four-fold. Increases in food grains, in edible oils and in the number of hogs have separately surpassed or approached increases of the past 20 years.

Cotton production in the 1970's increased greatly, making Jiangsu Province the first province in the nation to produce a total of more than 10 million dan of ginned cotton.

Now, food grain production in Jiangsu Province averages almost 1,000 jin per mu and ginned cotton production surpasses 100 jin per mu. Recently, Jiangsu Province has been shipping an average of more than one billion jin of food grains a year and 2.63 million dan of cotton (In the past three years, the province has shipped and exported, on the average, the equivalent of 1.83 dan of cotton yarn and cotton cloth a year), more than two million pigs and 20 million jin of oils. This leads the nation.

Jiangsu Province, situated at the lower reaches of five rivers--including Changjiang and Huai rivers--historically has had a relatively severe drought or flood every 2 or 3 years. In recent years, Jiangsu Province has eliminated

such damage and has prospered. High and stable-yielding farmlands have been established by managing surface and underground water and by simple water management and comprehensive management of irrigation and fertilization.

More than 80 percent of the province's arable land is irrigated. Between 80 and 90 percent of waterlogged, saline, and alkaline land has been improved. Large expanses of arable land which were easily flooded and easily affected by drought, as well as infertile and low yielding land, have become fertile and good land because threats of floods and drought have been eliminated. Now, the whole province has more than 34 million mu of high and stable-yielding farmland that are guaranteed to produce a harvest even when drought or floods occur.

Since the 1960s, Jiangsu Province has fully utilized its original industrial foundations and has built a series of local agricultural industries, such as agricultural machinery repair plants, chemical fertilizer plants, agricultural chemical plants and small cement plants. A local agricultural industry system that can basically adapt to the present level of production is forming.

The system produces more than 40,000 tractors a year and supplies all agricultural chemicals that the entire province needs, 77 percent of chemical fertilizers, 75 percent of thin film for agricultural use and 70 percent of cement.

Last year, on the average, one horsepower was available for every piece of land less than 6 mu throughout the province. The amount of chemical fertilizers applied on every mu reached 117 jin. For each mu an average of more than 33 kilowatt-hours of electricity was used. The area of machine-tilled land reached more than one-half the total arable land. High and stable agricultural yields have been stimulated.

In the 1970s, food grain production in Jiangsu Province increased more than 18 billion jin, surpassing the total increases of the past 20 years.

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CSO: 4007



## SICHUAN

### BRIEFS

CHONGQING SMALL RESERVOIRS--China News Agency Chengdu, Mar 27--In recent years, farm villages in suburban Chongqing have built 800 medium and small dams with a total capacity of 300,008,000 cubic meters capable of irrigating 840,000 mu. The city of Chongqing is located in a hilly region. Drought occurs frequently every summer. To develop agriculture in the Chongqing region, the people's government appropriated more than 100 million yuan in special funds to build medium and small dams. Recently, the state appropriated more special funds to build diversion channels, aqueducts for channeling water, tunnels, caves and irrigation and drainage stations. When completed, these engineering projects will greatly help farm villages in suburban Chongqing achieve bumper crop harvests. [Text] [Hong Kong ZHONGGUO XINWEN [CHINESE NEWS] in Chinese 28 Mar 80 p 2] 9296

CSO: 4007

## PUBLICATIONS

### II. PUBLICATIONS

#### TABLE OF CONTENTS OF 'LINYE KEXUE' VOL 16 NO 1, 1980

Beijing LINYE KEXUE [SCIENTIA SILVAE SINICAE] in Chinese Vol 16 No 1, 1980  
inside back cover

- [Text] Some Embryological Observations on the Tung Tree (Aleurites fordii Hemsl.).....Cao Juyi [2580 5468 6654] and Cheng Jinchen [4453 6027 6591], both of the Biology Department, Teachers College of Central China (1)
- Increasing Oleoresin Yield by Stim. 'ation with Spent Sulfite Liquor.....Oleoresin Tapping Section, Institute of Chemical Industry of Forest Products, Chinese Academy of Forestry (7)
- An Analysis of Rema's Opto-Electronic Apparatus for Log Diameter Measurement.....Shi Bozhang [0670 0130 4545], Nanjing Technological College of Forest Products (15)
- The Heat Balance in Forest Stands.....He Qingtang [6320 1987 2768], Beijing College of Forestry; Liu Zuochang [0491 4373 2490], Institute of Genetics, Chinese Academy of Sciences (24)
- Growth of Deodar Cedar (Cedrus deodara (Roxb.) G Don.) in Yunnan.....Zhang Maoqin [1728 5399 2953], Forest Research Institute of Yunnan Province (34)
- A Preliminary Study on the Use of Bethyid (Scleroderma sp. Bethyetodae) to Control Semanotus bifasciatus..... Forest Research Institute of Guangdong Province (41)
- Discussion
- Some Remarks on "Simulating Quadrant Sample Plot Method" .....Fu Wuru [4569 0124 0320], Guan Yuxiu [7070 3022 4423] and Zhou Peicun [0719 3099 2625], all of Beijing Forestry Academy (46)

Notes on Performance of F<sub>1</sub> Hybrids from Larix leptolepis  
x L. olgensis.....Wang Jingzhang [3769 2529 4545] and  
Cong Pelyan [0654 1014 5333], both of Liaoning Provincial  
Forest Management Institute (49)

An Experiment to Use Remote Sensing Images for Classifica-  
tion of Forest Land and Estimation of Its Productive  
Potentiality.....Forestry Suitability Team, Forestry  
Engineering Group 780 (53)

On "Bowen Ratio" as Used for Estimate of Forest Evapo-  
transpiration.....Zhu Jingwei [2612 0513 0251], Forest  
Soil Institute, Chinese Academy of Sciences (58)

Measurement and Analysis of Cutting Efficiency of  
Felling with Chain Saw.....Pan Delu [3382 1795 4389],  
Beijing Forestry Academy (62)

Observation on the Periodic Annual Growth of Korean  
Pine (Pinus koraiensis) Seedlings.....Lu Zhenyuan [4151  
2182 0337] and Jiang Jiande [5592 1696 1795], both of  
the Forest Soil Institute, Chinese Academy of Sciences (66)

Some Notes on the Occurrence and Control of Orgyia ericae  
Germar. ....Xu Zhaoji [6079 0340 1015], Department of  
Parks, Ningxia Academy of Forestry Sciences (70)

Preparation and Application of N-introduced Active  
Carbon.....Han Zhenxian [7281 2182 0341] and Ni Tonghan  
[0242 0681 3352], both of the Forest Products and  
Chemical Engineering Institute, Chinese Academy of  
Forestry Sciences (72)

Society Activities

9717

CS0: 4020

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